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# THE ADJUSTMENT OF THE TEACHING LOAD IN A UNIVERSITY

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# THE ADJUSTMENT OF THE TEACHING LOAD IN A UNIVERSITY.

## A. THE PURPOSE AND METHOD OF THE STUDY.

*The purpose of the investigation.*—Until the past decade or two educational administration has been notably laggard in attacking its problems by methods approximating the scientific. Tradition, sentiment, rule of thumb, temporizing compromise—these have been, and unfortunately, still are, the dominant methods in this important field of human enterprise. One of the largest of the problems in the administration of educational institutions is that of the proper method of determination of the working load of the members of the instructional staff. This problem has been with us ever since we have had schools. Administrators are only beginning to address serious efforts to its scientific solution. This is true even in our higher institutions, to which, because they have been the protagonists of scientific method, we should first turn for the light of example on such a significant problem. The investigation reported here is a pioneering attack upon this problem as it concerns colleges and universities. Being a pioneering study, it is admittedly defective and subject to improvement. At many points, as will be indicated, it is not safe to draw conclusions, and some of the conclusions drawn must, of course, when more and better facts are available, turn out to be inconclusive. It is believed, however, that there is here demonstrated a *method* of determining teaching loads for the instructional staff of a higher institution that is deserving of wider application—a method that is much more objective and reliable than the methods of tradition, sentiment, rule of thumb, and temporizing compromise that are now in use. It is believed, further, that there are a number of specific conclusions that will commend themselves to the judgment of many for their immediate applicability.

*The method of the investigation.*—In his attack upon the problem under consideration the writer began by assuming that there are but two factors which determine the actual working load an individual instructor is carrying—(*a*) the time consumed in the performance of his several functions as a member of a faculty and (*b*) the fatigue

resulting from such performance. There is large ground for the belief that the former is of much greater importance than the latter and will for the most part comprehend it. Although no studies of mental fatigue of members of a teaching staff have been made, a number of experiments have been conducted with school children which tend to discount very much the general belief in the large influence of mental fatigue upon efficiency in mental work. Even though members of a university faculty are no longer children, they must be subject to the operation of similar laws of mental economy, and therefore it will be pertinent to quote what two psychologists say in summary of the significance of these experiments. Freeman[1] says: "Fatigue is undoubtedly one of the factors which affect the efficiency of our work, but recent studies with school children have indicated that the amount of fatigue which we may expect to appear as a result of the ordinary work of the school day is much less than was formerly supposed." Thorndike,[2] after citing through several pages the main findings of a number of investigations, says: "There is a remarkable unanimity in the results summarized in this section in showing that ability to work is, in school pupils, throughout and at the close of the school session, almost or quite unimpaired." These statements concern *mental, not physical*, fatigue. The former is the type which would be our primary concern in this study if we should have need to give either of them consideration, since there is but a relatively small proportion of physical activity involved in the work of the university instructor.

Thorndike,[3] after reviewing the experiments investigating the relations of "muscular" work and fatigue to "mental" work and fatigue, concludes "that surely there is no uniform effect of muscular work upon mental efficiency and that the average intrinsic effect of moderate amounts of it is very slight." Furthermore, we must bear in mind that these statements concern actual *decrease in efficiency* of mental work, *not the feelings of weariness* which, according to Thorndike,[4] "from what little is known of them, * * * seem a very poor symptom of the loss of ability." Thus, although the fatigue resulting, e. g., from conducting a clock-hour lecture may not be the same as that of an hour of recitation or of laboratory, or, again, that resulting from an hour of recitation in mathematics may not be the same as that of an hour of recitation in law, because the influence of mental fatigue is not large in any event, there is not much justification for the contention that discrimination should be made in fixing

[1] Freeman, F. N. How Children Learn. Boston, Houghton, Mifflin & Co. Chapter XIV, Mental Economy and Control, Mental Hygiene, p. 288.
[2] Thorndike, E. L. Educational Psychology, Vol. III. Teachers College. Chapter IV, The Influence of Continuous Mental Work, Special or General, upon General Ability, p. 97.
[3] Op. cit., p. 109.
[4] Op. cit., p. 107.

the teaching schedules on the basis of fatigue, even if such fatigue were measurable. As already implied, it is much more important that, if large differences in time consumed in connection with clock hours of instruction are found, these be given recognition in such discriminations as are made. This opinion has the additional support of the fact already stated that discriminations based upon the total time investment in connection with a clock hour of instruction will also in considerable part comprehend the factor of fatigue.

The data concerning time consumed in their activities by teaching members of the faculty of the University of Washington which are used in this study were secured by means of a questionnaire which is reproduced in the appendix. It will be noted that the instructor was asked to report on time spent in his professional activities during one school week, May 14 to 19 (1917), inclusive. It will be seen also that such questions as appear on sheet 1 call, for the most part, for the time spent in non-teaching activities. An exception to this is question 1. Attention will be called to other less significant exceptions as they arise in presenting and interpreting the facts in the main body of this report. Questions 2, 3, and 4 ask for reports on the more purely noninstructional professional activities of teaching members of the faculty. Sheet 2 of the questionnaire was devised to secure a statement of all time spent in instructional work, including time spent in carrying on the class work, time required for immediate preparation for the work, in correcting papers of students in the classes, etc. This sheet, with question 1 of sheet 1, was designed to ascertain the "total time consumed" in the more purely instructional activities of the members of the teaching staff of the university.

The details of the methods of using the data gathered by means of the questionnaire will be described at appropriate points in the succeeding sections of this report.

## B. THE WORKING LOAD OF MEMBERS OF THE FACULTY OF A UNIVERSITY.

How much time per week and per day is actually spent by the members of the faculty of a university in connection with instructional work both in class and out? How much time is devoted to personal research and to other noninstructional professional activities? What constitutes the total working week and working day for those employed to teach in a university? These and some closely related questions are pertinent to the solution of the problem of determining the teaching load and will be answered from the data assembled for

the investigation before proceeding to the task of analyzing the influence of what we may term the factors of the teaching load.

*The total teaching time.*—Total teaching time is here understood to comprehend all work of an instructional character, including time spent in class, in preparation for class sessions, and in reading papers or doing other work connected with such class sessions, as reported on sheet 2 of the questionnaire. It includes also the time spent in the supervision of students working on individual research problems as reported under the first inquiry on sheet 1. It does *not* include work in connection with extension courses, nor such instruction as may have been given during office hours reported in inquiry 3 on sheet 1 of the questionnaire. The "teaching days" in hours of the members of the faculty in the University of Washington are shown in Table 1. The teaching day has been arrived at by dividing the total teaching time for the week by 5½, the number of teaching days in the school week at the time the data were collected.

TABLE 1.—*Teaching day of instructors in the University of Washington.*

| Length of teaching day, in hours. | All instructors. | Instructors not deans, librarians, nor subsidized for research. | Instructors not deans, heads of departments, librarians, nor subsidized for research. | Heads of other than one-man departments. | Deans. |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 2.0- 2.9 | 8 | 2 | 1 | 1 | 3 |
| 3.0- 3.9 | 9 | 7 | 5 | 2 | 1 |
| 4.0- 4.9 | 17 | 16 | 14 | 2 | 1 |
| 5.0- 5.9 | 27 | 26 | 21 | 5 | 1 |
| 6.0- 6.9 | 12 | 12 | 12 | ..... | ..... |
| 7.0- 7.9 | 14 | 13 | 13 | ..... | 1 |
| 8.0- 8.9 | 6 | 6 | 4 | 2 | ..... |
| 9.0- 9.9 | 2 | 2 | 1 | 1 | ..... |
| 10.0-10.9 | 4 | 4 | 4 | ..... | ..... |
| 13.0-13.9 | 1 | 1 | 1 | ..... | ..... |
| Total number in group | 100 | 89 | 76 | 13 | 7 |
| Average number of hours in teaching day[1] for group | 5.8 | 6.0 | 6.1 | 5.5 | 4.2 |

[1] Not computed from this table, but from original figures for the teaching day of each member of the faculty used in making the table.

The import of the table is perhaps so obvious as to require only brief interpretation. In column 2 of this table is shown the distribution of these teaching days of 100 members of the faculty whose responses in the questionnaire were made in such a manner as to permit the computation of the length of the teaching day. No member of the faculty who is employed by the university for part time only is represented in this column. It includes the teaching days of 7 deans,

3 librarians devoting only part time to instruction, 1 instructor subsidized for research and devoting only half-time to instruction, and 13 heads of other than one-man departments who are not deans. These 100 teachers are approximately three-fifths of those on the instructing staff of the university at the time reports were called for.[1] It is to be noted that the teaching day ranges in length from 2 hours to 13.9 hours—a strikingly wide variation. The distribution is in rough approximation to the curve of normal frequency, the modal number of hours in the teaching day being 5–5.9. The average teaching day, computed not from the table but from the original figures for the teaching days of each member of the faculty, is 5.8 hours. Column 3 reports the teaching days of 89 instructors, excluding 7 deans, 3 librarians, and 1 instructor subsidized for research, and shows a range and distribution of teaching days very similar to that in column 2, the essential difference, as is to be expected, being the smaller number of short teaching days in column 3. The model teaching day is still the same, while the average is only slightly greater, 6 hours, as compared with 5.8 hours for the entire group of 100 instructors. Column 4 shows the distribution for the 76 instructors remaining after excluding those already excluded in column 3 and also 13 heads of other than one-man departments who are not at the same time deans. We have thus remaining in column 4 the teaching days of those who are given no special remissions of teaching hours for administrative and other activities. We find in this column the same range and much the same distribution of hours in the teaching day as before, with an average teaching day but one-tenth of an hour longer than shown in the preceding table.

This table also presents in columns 5 and 6, respectively, the teaching days of 13 heads of other than one-man departments and of 7 deans. The former group includes no heads of departments who are also deans, as these have been included in the group of deans. The teaching days of these two groups are given special attention at this point because they include the officers of administration who are allowed remissions of teaching hours for the work of administration. Columns 5 and 6 of the table show that they devote less time to teaching work than do those whose teaching days are tabulated in column 4. The difference is striking in the case of the deans who devote approximately two-thirds as many hours per day to teaching work as do the members of the group in the column mentioned. It is less striking for the heads of departments who spend approximately

[1] A total of 110 instructors filled out the questionnaire, but for one reason or another the responses of 10 could not be used for this portion of the study.

eleven-twelfths as much time to teaching work as do those in the nonadministrative group.

*Time spent in the supervision of students working on individual research problems.*—Mention has been made (p. 8) of the fact that time spent in supervising students working on individual research problems has been included in the total teaching time of the instructors reporting for this investigation. Only 43 of the group of 100 instructors whose reports were used in studying the total time devoted to teaching report students working on such problems during the second semester of the school year 1916–17. Fifty-seven instructors, more than half, report no such supervision. The 43 responsible for instruction of this sort report a total of 124[1] students—an average of about 3 students per instructor. The total amount of time spent in such supervision by all members of the faculty reporting during the week of May 14–19 was 94.8 hours, or an average of 0.76 hour per student. This total of 94.8 hours is slightly less than 3 per cent of the total of 3,172 hours spent in all instructional work during that week by the entire group of 100 instructors. Whether it is an important consideration in adjusting the teaching load must be determined largely by the number of such students the individual instructor is supervising.

Some light is thrown on this problem by Table 2, which shows the distribution of such students according to the responses in the questionnaire. If we recall that the average weekly time expenditure per student in work of this nature is but 0.76 hour, it will be seen by reference to this table that a relatively small number of instructors will need to have such an adjustment made for them. If no adjustment has already been made in assigning to the instructors the courses in which these students are enrolled, it will be advisable to make some reduction in the teaching schedule of those who must supervise the work on individual research problems of four or more students.

*Time spent in all noninstructional activities.*—The aspect of the working load of members of the faculty of a university to which we now direct our attention is the total time spent in activities comprehended by questions 2, 3, and 4 on sheet 1 of our questionnaire (see appendix). It is to be noted that these inquire after time spent in personal research, in "other official duties for the university (office hours, committee work, administrative functions, etc.)," and in "professional activities not otherwise reported."

[1] In this number have been included only those students who were enrolled in courses regularly listed as courses in individual research. The number does not include those students working on semester theses in courses devoted largely to regular class instruction.

TABLE 2.—*Distribution of students working on individual research problems.*

| Number of students. | Number of instructors. |
|---|---|
| 0 | 57 |
| 1 | 18 |
| 2 | 5 |
| 3 | 7 |
| 4 | 5 |
| 5 | 1 |
| 6 | 3 |
| 7 | 1 |
| 8 | 2 |
| 9 | 1 |
| Totals—— 124 | 100 |

Although the term is in a slight measure a misnomer, this part of the working load will be referred to here as the noninstructional load. The partial inapplicability of the term is illustrated by the fact that the personal research (see question 2, sheet 1, appendix) may sometimes be rightly considered direct, or almost direct, preparation for class work. However, the difficulty of distinguishing between such personal research and preparation for class work is mentioned by but 2 of the 100 instructors whose answers are used in the present section of this investigation. Again, office hours (see question 3, sheet 1, appendix), especially of instructors other than deans and heads of departments, are at once seen to be set aside in part or whole for instructional purposes. That a few of the "professional activities not otherwise reported" (see question 4) are instructional in character may be seen by referring to Table 3, which shows the frequency with which the many sorts of "professional activities not otherwise reported" recurred in the reports of 100 instructors. "Miscellaneous work connected with teaching" may in three of the six cases be properly classified as instructional. The same may be said of all four instances of "work on future courses." One of the reports classified under "Special conferences with members of faculty or students" was probably instructional. The remainder of the classifications are not chargeable to instructional time, in the sense in which this term is here being used. Under "Professional reading" has been included only general professional reading, not that which is calculated to prepare for a specific course. "Extension work," although instructional, is not work done in connection with instructional work going forward on the campus. On the whole, the term "noninstructional" is seen to be fairly applicable.

TABLE 3.—*Classification of "Professional activities not otherwise reported."*

| Activity. | Number of times reported. |
|---|---|
| Professional service for public | 17 |
| Professional societies or clubs | 17 |
| Professional reading | 12 |
| Extension work | 9 |
| Public lectures and addresses | 9 |
| Miscellaneous work connected with teaching | 6 |
| Work on future courses | 4 |
| Military drill (faculty company) | 4 |
| Cooperation in student activities | 4 |
| Special conferences with members of faculty or students | 3 |
| Work on material intended for publication | 3 |
| Work on university plant | 3 |
| Professional correspondence | 2 |
| Professional investigation (not research) | 2 |
| Red Cross parade | 2 |
| Faculty meeting [1] | 2 |
| Faculty forum meeting | 2 |
| Departmental meeting | 2 |
| Miscellaneous | 5 |
| Total number of different instructors reporting these activities | 64 |
| Number reporting no such activities | 36 |

[1] As there was no faculty meeting held during the week of May 14–19, it is probable that these two reports refer to attendance upon a meeting of the faculty forum, a voluntary and unofficial body attendance upon whose meetings is reported as a type of activity immediately following this type by two other members of the faculty.

Having set down such qualifications as need to be made on the use of the term, we next proceed to a brief study of this noninstructional load of the 100 members of the faculty of the University of Washington whose reports could be utilized for this purpose. The distribution of the members of the faculty by hours per day spent in such activities is shown in Table 4. Column 2 of this table displays the distribution for all these instructors. Of the entire group, 19 spend less than one hour per day in these noninstructional activities.[1] Of the entire group 78 spend less than 4 hours in this way, only 22 reporting 4 hours or more. The average for all is 2.7 hours per day. Columns 3 and 6 in this table are introduced to detect the influence on the noninstructional load of holding administrative offices or performing certain other functions for the university. Column 3 gives the distribution for the 89 instructors remaining after the figures for 7 deans, 3 librarians devoting only part time to instructional work, and 1 instructor who is subsidized for noninstructional work have been excluded. Their elimination is at once seen to decrease the distributions in the larger classifications, 9 of the 11 eliminated reporting four hours or more of noninstructional work. The influence of this elimination may also be seen in the average, which is here 2.4 hours per day. The next column excludes in addition the figures for 13 heads of other than one-man departments (who are not also deans). This further exclusion is seen again to reduce the num-

[1] A footnote to the table calls attention to four members who report no work of this sort.

bers in the larger classifications, while the average number of hours spent in noninstructional activities by these 76 instructors is but 2.2. Columns 5 and 6, respectively, present the distribution for 13 heads of other than one-man departments and for 7 deans. The average for the former group is 4.1 hours, and for the latter 4.6 hours.

TABLE 4.—*Time spent in activities largely noninstructional in character (personal research, office hours, administrative duties, committee work, and other professional activities) by members of the faculty of the University of Washington.*

| Number of hours per day. | All instructors. | Instructors exclusive of 7 deans, 3 librarians, and 1 other instructor. | Instructors exclusive of 7 deans, 13 heads of other than one-man departments, 3 librarians, and 1 other instructor. | Heads of other than one-man departments. | Deans. |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 0.0–0.9 | [1] 19 | [1] 19 | [1] 19 | ..... | ..... |
| 1.0–1.9 | 22 | 22 | 21 | 1 | ..... |
| 2.0–2.9 | 18 | 16 | 13 | 3 | 2 |
| 3.0–3.9 | 19 | 19 | 16 | 3 | ..... |
| 4.0–4.9 | 8 | 6 | 4 | 2 | 2 |
| 5.0–5.9 | 6 | 3 | 1 | 2 | 2 |
| 6.0–6.9 | 5 | 2 | 1 | 1 | ..... |
| 7.0–7.9 | ..... | ..... | ..... | ..... | ..... |
| 8.0–8.9 | 2 | 1 | ..... | 1 | 1 |
| 9.0–9.9 | 1 | 1 | 1 | ..... | ..... |
| Number in group | 100 | 89 | 76 | 13 | 7 |
| Average number of hours per day | 2.7 | 2.4 | 2.2 | 4.1 | 4.6 |

[1] Four of these report no such activities.

In the tabulations of the time devoted to the several kinds of work done by an instructor during the week under consideration the writer has assumed an almost uncritical attitude—i. e., he has assumed that the instructor reporting has been justified in including all the time and activities that he has reported. Pains were taken, of course, in framing the questionnaire that only time spent in legitimate professional activities should be reported, and it is felt that the responses are fairly free from reports on other than such legitimate activities. Nevertheless, it is doubtful whether a questionnaire could be so framed or a hundred copies of the questionnaire could be so filled as to eliminate entirely all extraneous activities. Although assuming the uncritical attitude to which reference has been made and regarding as legitimate all work reported in the tabulation, the investigator became conscious of a possible source of error in the mode of statement of question 4 on sheet 1 of the questionnaire.[1] It is probably certain that, because those who filled out the questionnaire were not definitely directed to exclude from their answer to this ques-

[1] See appendix.

tion all professional activities for which they were receiving remuneration from other than university sources, and exclusive of salary received as officers of the university, some such professional activities have been here reported. We may here refer again to Table 3, which presents a classification of these activities, in furnishing corroboration of the statement just made. In the first group, "Professional service for public," are included only a very few for which such outside remuneration may have been received. The group reporting attendance upon, or activity in connection with, "Professional societies or clubs" manifestly would include none receiving such remuneration. Most of those whose reports are included under "Extension work" are receiving some small additional remuneration for the work. The total amount of time here does not exceed a few hours. The "Public lectures and addresses" may include a few commencement addresses for which outside remuneration is customarily received. One of the six in the next group in the table is reported as "tutoring out-of-town pupils," for which it is possible the instructor received some remuneration. A careful examination of the reports shows no other activities for which outside or additional remuneration may have been received. It does, however, discover a few reports of additional activities which need not be quoted here, because of the small amount of time devoted to them, and which are doubtfully chargeable to the working load of a member of the faculty of a university.

TABLE 5.—*Time devoted to personal research by instructors in the University of Washington.*

| Number of hours during the week. | All instructors. | Instructors exclusive of deans, librarians, and 3 other instructors[1]. | Heads of other than one-man departments. | Deans. |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 0.0– 1.9 | [2] 54 | [3] 45 | [4] 8 | [4] 4 |
| 2.0– 3.9 | 7 | 5 | | 2 |
| 4.0– 5.9 | 14 | 14 | 1 | |
| 6.0– 7.9 | 11 | 10 | 1 | |
| 8.0– 9.9 | 4 | 3 | 2 | 1 |
| 10.0–11.9 | 3 | 3 | | |
| 12.0–13.9 | 2 | 2 | 1 | |
| 14.0–15.9 | | | | |
| 16.0–17.9 | 1 | 1 | 1 | |
| 18.0–19.9 | | | | |
| 20.0–21.9 | 1 | 1 | | |
| 22.0–23.9 | 1 | 1 | | |
| 24.0–25.9 | 1 | 1 | | |
| 41.0 | 1 | 1 | | |
| Total number in group | 100 | 87 | 13 | 7 |
| Average number of hours in personal research during week | 3.7 | 4.1 | 3.0 | 2.1 |

[1] These by agreement perform other services for the university in time not spent in teaching.
[2] Includes 48 who carried forward no research during the week.
[3] Includes 39 who carried forward no research during the week.
[4] None of these carried forward research during the week.

A careful estimate of all time spent in such professional activities doubtfully chargeable to the working load of the faculty member does not place the maximum total above 80 hours for the week for all instructors. It is probably considerably less than this. But, taken at this maximum estimate, it would be but 0.15 hour per day per instructor, and could therefore introduce only a proportionally small and almost inconsiderable error into the computation of the average noninstructional load or total working load of instructors.

*Time spent in personal research.*—It will be profitable now to proceed to a more detailed study of the noninstructional load of a university faculty by scrutinizing successively the three main parts into which it may be divided, parts implicit in questions 2, 3, and 4 on sheet 1 of the questionnaire. The first part is that comprehended by what we have termed "personal research."[1] The main facts as to time spent in this work during the week upon which we have reports are presented in Table 5. Column 2 of this table shows that 54—more than half—of the group of 100 instructors whose reports could be used for this part of the investigation spent very little or no time in research. In fact, as indicated in a footnote to the table, all but 6 of this group of 54 (i. e., 48 instructors), report no time spent in this way. In other words, practically half of all the instructors reporting for this investigation spent no time in research. The remaining instructors, 52 in number, spent from a fraction of an hour to 41 hours in this kind of activity during the week. Most of these, however, reported less than 8 hours of research. The average number of hours per week, computed not from the distribution in column 2 but from the original figures for individual members of the faculty, is 3.7, which is approximately two-thirds of an hour per day.

As it may by some be considered unfair to pass a judgment upon time devoted to research by members of a group, some of whom are, by the nature of their positions, prevented from carrying forward any personal research, in column 3 of Table 5 has been introduced the distribution in numbers of hours spent in research by those from whom we are more nearly justified in expecting research. From the group here concerned have been excluded 7 deans, 3 librarians devoting only part time to instruction, and 3 other instructors by agreement with the university performing other services for it in the time not spent in teaching. The exclusion of these can not markedly affect the distribution of instructors as to time spent in research, although the reduction in numbers of instructors is largely in the

[1] The term "personal research" is here used to distinguish the research being carried forward by the member of the faculty himself from that which students are working out under his supervision.

classifications devoting small amounts of time. Here, again, a footnote calls attention to a very large number who spent no time in research. The average amount of time so spent—4.1 hours per week—is seen to be somewhat higher, indicating a small measure of justification for the charge preferred in the opening sentence of this paragraph. Nevertheless, if this week of May 14–19 may be taken to be a representative cross section of a working year in this university—and there is little occasion for believing it to be markedly otherwise—one of the lines of activity a university is expected to encourage, viz, research on the part of its faculty, is being far from generally pursued, although some are devoting generous amounts of time to it.

In columns 4 and 5 of this table are presented the facts as to research time, respectively, of heads of other than one-man departments and of deans. The former devote slightly less time on the average to research than do those whose research time is tabulated in column 3, while the latter, as is to be expected because of their burden of administrative work, spend notably less time—in fact, about one-half as much.

TABLE 6.—*Time spent in other official duties (office hours, committee work, administrative functions, etc.) by members of the faculty of the University of Washington.*

| Number of hours per week. | Full-time instructors. | Heads of other than one-man departments. | Deans. |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 0.0– 1.9 | 31 | | |
| 2.0– 3.9 | 17 | 1 | 1 |
| 4.0– 5.9 | 11 | | |
| 6.0– 7.9 | 8 | 2 | |
| 8.0– 9.9 | 3 | 1 | |
| 10.0–11.9 | 4 | | |
| 12.0–13.9 | | 2 | 1 |
| 14.0–15.9 | 1 | 1 | |
| 16.0–17.9 | 1 | 1 | |
| 18.0–19.9 | | 1 | |
| 20.0–21.9 | | | 1 |
| 22.0–23.9 | | | 2 |
| 34.0–35.9 | | | 1 |
| 36.0–37.9 | | | 1 |
| 40.0–41.9 | | 1 | |
| Total number in group | 76 | 13 | 7 |
| Average number of hours per week | 3.6 | 15.1 | 18.3 |

*Time spent in other official duties (office hours, committee work, administrative functions, etc.).*—A second portion of the noninstructional load deserving some special attention is the time spent in "other official duties for the university (office hours, committee work, administrative functions, etc.)," a report on which was called for in inquiry 3 on the first sheet of the questionnaire (see appendix).

Table 6 presents the distribution in hours per week in this work for 76 full-time instructors; i. e., all instructors remaining in our total group of 100 after excluding deans, librarians, heads of other than one-man departments, and one other instructor subsidized for investigation (column 2), for 13 heads of other than one-man departments (column 3), and for 7 deans who are also heads of departments (column 4). At the foot of the distribution columns are shown the averages for each of these groups. As is to be expected, both the distributions and the averages indicate a marked tendency toward an increase of time required for these activities as we proceed from the full-time instructors through the heads of departments to the deans. The fact that the average for the heads of departments is within approximately three hours of that for deans may be partially explained by the one head of department reporting 11.3 hours of such activity for the week. The average for the 12 remaining heads of departments is 10.4 hours. If the medians—this measure of central tendency not being as susceptible of the influence of extreme cases as is the average—were computed, they would be approximately 3, 9, and 23 hours, respectively, for the three groups. It is clear that the burden of work of this nature does not rest heavily on more than relatively few of the full-time instructions, and where it does not exceed five or six hours per week there can be little necessity of making special allowance on the teaching schedule for it. For full-time instructors upon whom are made such exceptional demands for this type of activity calling for much more than the average of 3.6 hours per week, it would be but fair to make some such special allowance as just mentioned. If the figures presented in Table 6 are normal, heads of other than one-man departments should have some reduction of teaching schedule for such work and most deans should have an even greater reduction. Since the demand for such activity must be heavier for some heads of departments and deans than for others, it will be necessary to discriminate by making greater allowance to some than to others, the allowance being proportioned to the demands. The figures for the one week which were used in compiling Table 6 do not warrant us in here making recommendations as to what these allowances should be for particular heads of departments or deans. Before doing this we should need reports covering a longer period of time.

*Time spent in "professional activities not otherwise reported."*—We have already given some attention to the many sorts of professional activity reported in answer to question 4 on the first sheet of the questionnaire—i. e., all professional activities exclusive of teaching work, personal research, and "other official duties for the university (office hours, committee work, administrative functions, etc.)."

As these additional professional activities may play an important part in determining the working load of a member of the faculty of a university, we now extend our analysis of the answers to the question. Unfortunately, the directions of question 4 called for the total amount of time spent in all such activities and for a list of them only, neglecting to request a statement of the time spent in connection with each kind of activity reported. A large proportion of the instructors volunteered the information just referred to, but because a number did not supply it our analysis can give little more than a very imperfect account of the proportion of the total time spent in "professional activities not otherwise reported" which is devoted to each of the several classes of activity into which we have divided the reports. However, some estimate of this proportional relationship may be made from the numbers of instructors reporting the several classes as presented in Table 7. These numbers of instructors are presented for each of the subjects or subject groups represented by at least 3 of the total number of 100 questionnaires used in this section of the report. A number of subjects are therefore not represented in the table. The classes into which these other professional activities have been divided are as follows: (*a*) General professional reading—i. e., professional reading not directly applicable as preparation for any particular course; (*b*) campus professional societies and clubs, such as the Philological Club or a colloquium; (*c*) extension work, usually correspondence instruction; (*d*) other off-campus professional activities, such as public addresses or other professional service for or in contact with the public; and (*e*) miscellaneous professional activities of many sorts, something as to the nature of which may be discovered by a glance through the categories of Table 3. Table 7 reports in addition the number of instructors reporting; (*f*) no other professional activities, as well as the average number of hours per week per instructor devoted to all of the classes of activity just named.

It is at once manifest that only for foreign language, mathematics, the sciences, and engineering are the numbers of instructors reporting large enough to give the figures in the remaining columns of the table even an approximation to dependability. Of the large group of 22 instructors of foreign language, 3 reported general professional reading, 5 reported activity in connection with a campus professional club, 1 reported time spent in extension work, 3 reported other off-campus professional activities, 3 reported miscellaneous professional activities, 9 reported no other professional activities, while the average number of hours per week in these activities is but 3.1, or slightly more than a half hour per day. A comparison of this distribution with that of some of the other groups and with the figures of totals in the lowest horizontal row shows a tendency in this subject group toward a relatively infrequent participation in off-campus

professional activities, a larger proportion of instructors devoting no time to these "other professional activities," and a smaller average number of hours per week per instructor in such activities. A similar tendency is evident in the figures for the instructors of mathematics. In contrast to these are the distributions for the sciences and engineering, in which a larger proportion report off-campus professional activities, a smaller proportion reporting no other professional activities and a higher average number of hours of such activities per week per instructor than do foreign language and mathematics. While the remaining subjects and subject groups are less adequately represented than the four so far named, the data shown concerning them may deserve at least passing mention. The average number of hours per week for 6 instructors of English is approximately that of the total of 84 instructors, data for whom are included in this table. The average for the social studies is surprisingly low, considering the nature of the subject taught by the instructors in this group—2 were teaching economics; 1, political science; 1, sociology; and 1, history. In the light of the nature of most of these subjects, one expects for most of them more time than the table reports. Although the nature of the subject is such as to require considerable touch with the public schools the average for education is probably higher than normal. The average for psychology and philosophy is also probably higher than normal. The figures for home economics are not unlike those for the sciences. Those for law, because they are based upon the reports of but three instructors, are scarcely deserving of attention.

TABLE 7.—*Number of instructors devoting time to "professional activities not otherwise reported" and the average number of hours per week so spent.*

| Subject or subject group. | Number of instructors reporting. | Number of instructors devoting time to— | | | | | | Average number of hours per week per instructor. |
|---|---|---|---|---|---|---|---|---|
| | | (a) General professional reading. | (b) Campus professional societies. | (c) Extension work. | (d) Other off-campus professional activities. | (e) Miscellaneous professional activities. | (f) No other professional activities. | |
| Foreign language | 22 | 3 | 5 | 1 | 3 | 3 | 9 | 3.1 |
| English | 6 | ..... | ..... | 2 | 1 | ..... | 3 | 4.6 |
| Mathematics | 8 | 1 | ..... | ..... | ..... | 3 | 5 | 2.7 |
| Social studies | 5 | 1 | ..... | 1 | 1 | ..... | 3 | 3.0 |
| Education | 4 | 2 | ..... | 1 | 4 | ..... | ..... | 13.7 |
| Philosophy and psychology | 4 | 2 | ..... | 2 | 1 | 1 | ..... | 10.4 |
| Sciences | 15 | 1 | 2 | 2 | 5 | 5 | 5 | 4.1 |
| Home economics | 4 | 1 | ..... | 1 | 2 | 3 | 1 | 4.8 |
| Engineering | 13 | 1 | ..... | ..... | 6 | 2 | 3 | 6.0 |
| Law | 3 | ..... | ..... | 1 | 1 | ..... | 2 | 3.3 |
| Total | 84 | 12 | 7 | 11 | 24 | 17 | 31 | 4.7 |

Notwithstanding the acknowledged weakness of the figures just cited, they have a general import that may not well be ignored. The

average number of hours spent in the activities under consideration, according to Table 7, is 4.7. When the average number of hours spent in such activities is computed for the entire group of 100 instructors, it is found to be 5.5. Thus the average may be said to approximate 5 or 6 hours per week. The statement is occassionally made that reductions in the teaching schedule should be made to allow for these activities. It must be evident at once from the figures presented that it would be unwise to make a uniform allowance for all subjects and all instructors; some subjects are of such a character as to require more time than others in the professional activities under consideration. The more reasonable procedure would be to make no such allowance except for subjects where the average number of hours per week exceeds markedly the average here found, 5 or 6. There are no doubt subjects for which and instructors for whom such concessions should be made. In general these will be the newer and more rapidly developing subjects—what we may term the *dynamic* subjects—and the instructors of these subjects who are keeping fully abreast of the developments in them. As soon as it appears that such concessions are no longer necessary or are no longer properly utilized, they should be withdrawn. Because of the paucity and weakness of the figures for subjects and subject groups as here reported, before the extent of such concessions may be justly determined, a supplementary investigation should be made into the time spent in these other professional activities either by a larger number of instructors, or through a longer period of time, or both. Such a supplementary investigation should make the additional distinction between other professional activities that bring additional remuneration and those that do not, since the justice of making concessions for activities for which the instructor is receiving adequate additional remuneration is bound to be called into question.

TABLE 8.—*The working day of 100 instructors in the University of Washington*

| Length of working day in hours. | Number of instructors. |
|---|---|
| 4.0— 4.9 | 4 |
| 5.0— 5.9 | 10 |
| 6.0— 6.9 | 14 |
| 7.0— 7.9 | 15 |
| 8.0— 8.9 | 14 |
| 9.0— 9.9 | 17 |
| 10.0—10.9 | 10 |
| 11.0—11.9 | 11 |
| 12.0—12.9 | 1 |
| 13.0—13.9 | 3 |
| 14.0—14.9 | 1 |
| Total number of instructors | 100 |
| Average working day in hours | 8.5 |

*The total working load of members of the faculty of a university.*—Table 8 shows the distribution of 100 members of the faculty of the University of Washington as to number of hours in the total working day.[1] The total working day of each instructor has been obtained by adding together what has previously been reported in this study as the total teaching time per day and the time spent per day in noninstructional activities, the actual total working day charge-all time spent in connection with class work both within and without the class period (see sheet 2 of the questionnaire reproduced in the appendix), time spent in the supervision of students working on individual research problems (question 1, sheet 1), time spent in personal research (question 2), time spent on "other official duties for the university (office hours, committee work, administrative functions, etc.)," and, lastly, time spent in "professional activities not otherwise reported." This table discloses a remarkably wide range in the length of the total working day, from 4 hours to 14.9 hours—a difference of nearly 11 hours between the shortest and the longest working days in this group of 100 instructors. However, relatively small numbers are to be found in the 4–4.9 hour group at the lower extreme and in the 12–12.9, 13–13.9, and 14–14.9 hour groups. Fairly large and approximately equal numbers—from 10 to 17—are to be found in each of the intervening groups. Thus the distribution here does not, as with the teaching day (see Table 1), remotely resemble the curve of normal frequency; nor is there a marked modal length of working day. The average length of working day is 8.5 hours, remarkably near the 8-hour day being advocated and carried into effect by legislation for other occupations. From what has been said above (p. 16) in the discussion of the facts concerning time spent in noninstructional activities. Thus this total working day includes able to the university may be slightly less than the average of 8.5 hours here reported, but the maximum error due to the introduction of such extraneous professional activities can hardly be more than 0.15 of an hour.

*Relationships of the components of the total working load.* (*a*) *Hour and percentage relationships.*—Thus far in this part (B) of this report we have presented the facts concerning time spent in instructional activities, in all noninstructional activities (including personal research, official duties for the university, and professional activities not otherwise reported), and also concerning the total working load of members of a university faculty. As we have not yet directly investigated the relationships that may exist between the components of the total working load, we now turn to this important phase of our main problem.

[1] Computed on the basis of the 51-day teaching week in operation at the time the data were collected.

The relationship may first be studied by comparing the average number of hours spent in each of the different kinds of work and in all work by members of the faculty. These averages will be found in Table 9. Besides presenting the averages for teaching work (columns 2 and 3), personal research (columns 4 and 5), noninstructional activities (columns 8 and 9), and all working time (columns 10 and 11), this table indicates the average number of hours devoted to "other activities" (columns 6 and 7), i. e., to noninstructional activities not including personal research. The facts are made somewhat clearer by Table 10, which presents the percentages the average number of hours spent in each of the different activities are of the average total working time per week. This table shows that the average per cent of the total working time spent in connection with teaching work for the entire group of 100 instructors whose reports were usable for this part of our study was 68. Thirty-two per cent was spent in noninstructional activities and of this time 8 and 24 per cent, respectively, were devoted to personal research and to other noninstructional activities. When the reports for 7 deans, 3 librarians, and 1 other person not considered a full-time instructor are excluded, the average per cent spent in teaching work rises to 71, the per cent in noninstructional activities dropping to 29. For this group, research time is higher by 1 per cent than for the entire group of 100 instructors, while the per cent of time spent in other activities drops by 4. By excluding, in addition to those excluded from group 2, 13 heads of other than one-man departments, thus leaving only those who may justly be considered full-time instructors, we note another rise in average per cent of time spent in teaching work, to 74, noninstructional activities consuming 26 per cent of the total time. Here we find no anticipated increase in the proportion of time spent in personal research, although we find a decrease in time spent in other activities. Heads of other than one-man departments, on the average, devote only 57 per cent of their working time to teaching, the remaining 43 per cent being spent in noninstructional activities. These heads of departments devote a somewhat smaller percentage of time to personal research than do those in the preceding group, and more than twice the percentage in other activities.

TABLE 9.—*Average number of hours spent in teaching work, personal research, other activities, all noninstructional activities, and all work by members of the faculty of the University of Washington.*

| Group of faculty members. | Average number of hours devoted to teaching work. | | Average number of hours devoted to personal research. | | Average number of hours devoted to other activities. | | Average number of hours devoted to personal research and other activities. | | Total average number of working hours. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Per week. | Per day. | Per week. | Per day. | Per week. | Per day. | Per week. | Per day. | Per week. | Per day. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 1. One hundred instructors[1] | 31.7 | 5.8 | 3.7 | 0.7 | 11.4 | 2.1 | 15.1 | 2.7 | 46.8 | 8.5 |
| 2. Eighty-nine instructors (excluding 7 deans, 3 librarians, and 1 other person, none of these being considered full-time teachers) | 33.2 | 6.0 | 4.0 | .7 | 9.4 | 1.7 | 13.4 | 2.4 | 46.5 | 8.5 |
| 3. Seventy-six instructors (excluding, in addition to those omitted from Group 2, 13 heads of other than one-man departments) | 33.7 | 6.1 | 4.0 | .7 | 7.9 | 1.4 | 11.9 | 2.2 | 45.5 | 8.3 |
| 4. Thirteen heads of other than one-man departments (who are not also deans) | 30.1 | 5.5 | 3.6 | .7 | 19.1 | 3.5 | 22.7 | 4.1 | 52.8 | 9.6 |
| 5. Seven deans | 22.9 | 4.2 | 2.1 | .4 | 23.3 | 4.2 | 25.4 | 4.6 | 48.3 | 8.8 |

[1] All instructors whose responses could be used in this part of the investigation, including deans, librarians, heads of departments, etc.

TABLE 10.—*Average per cent of the average total working time spent in teaching work, personal research, other activities, and all noninstructional activities by members of the faculty of the University of Washington.*[1]

| Group of faculty members. | Teaching work. | Personal research. | Other activities. | Non-instructional activities. |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* |
| 1. One hundred instructors | 68 | 8 | 24 | 32 |
| 2. Eighty-nine instructors (excluding 7 deans, 3 librarians, and and 1 other person, none of these being considered full-time teachers) | 71 | 9 | 20 | 29 |
| 3. Seventy-six instructors (excluding, in addition to those omitted from Group 2, thirteen heads of other than one-man departments) | 74 | 9 | 17 | 26 |
| 4. Thirteen heads of other than one-man departments (who are not also deans) | 57 | 7 | 36 | 43 |
| 5. Seven deans | 47 | 4 | 48 | 53 |

[1] Computed from the figures for "hours per week" to be found in Table 9.

The tendencies shown for deans are the same as those for heads of departments, except that, as is to be anticipated, they are much more marked for the former group. The total working time of deans is seen to be approximately equally divided between teaching work and noninstructional activities. Their average per cent of time spent in personal research is approximately half that for the preceding group, while the proportions of time spent in other activities and in teach-

ing work are almost identical. The essence of these facts may be presented in another way by saying, e. g., that, on the basis of reports made by 100 members and disregarding distinction between full-time instructors and those who devote part time to administration, for every three members of the faculty employed the university may expect the approximate equivalent of two members devoting all their working hours to teaching work and one all his time to noninstructional activities; that for every four full-time instructors employed the university may expect the approximate equivalent of three instructors devoting all their working hours to teaching work and one all his time to noninstructional activities; that for every two deans employed the university may expect the approximate equivalent of one devoting all his working hours to teaching work and one all his time to noninstructional activities; also, that for every 12 members of the faculty employed the university may expect the approximate equivalent of one member devoting all his working time to research.

(*b*) *The coefficients of correlation.*—An extension of large significance in the study of the relationships of the components of the total working load is made possible by the investigation of these relationships through the computation of the Pearson coefficient of correlation and the regression equations.[1] These coefficients and equations are assembled in Table 11. In the left-hand column of this table are given the names of each pair of series of data for which the coefficients and regression equations have been computed. The coefficients and equations are seen to have been computed for three groups of instructors. The group of 100 includes all instructors whose reports have been so far utilized in this study, among them 7 deans; 3 librarians, devoting only part time to instruction; 13 heads of other than one-man departments; 2 instructors who, although carrying a full teaching load, by agreement with the university perform other services for it during the time not spent in teaching; and 1 instructor subsidized for investigation. The group of 87 omits the 7 deans, 3 librarians, and the 3 instructors last named. The group of 76 excludes also the 13 heads of other than one-man departments, but includes the 2 instructors who by agreement perform the "other services" for the university. The purpose of the grouping will become manifest as we proceed with the interpretation of the table.

The computation of these coefficients of correlation has made it possible to investigate the reliability of a statement frequently made, and an opinion frequently held, in university circles—viz, that a proper method of encouraging research includes as its most important feature a general reduction of the teaching schedule of all members of a faculty. This theory assumes that there is a rather constantly operating causal relationship between time spent in teaching and

time spent in research; that as the former increases, the latter decreases, and vice versa. If this were true we should find in Table 11 a large negative coefficient of correlation, which is not the case. It is negative but it is very small, not only when computed for the entire group of 100 instructors, but also for the group of 87 instructors and, again, for the group of 76 instructors; i. e., when only those who are expected to carry a full teaching load, and who have no large and specially assigned administrative or other function to perform, are considered.[1] The significance of these small negative correlations may be better appreciated after quotation from Rugg[2] on the meaning of coefficients of differing magnitudes:

> The experience of the present writer in examining many correlation tables has led him to regard correlation as "negligible" or "indifferent" when $r$ (the coefficient of correlation) is less than .15 to .20; as "present but low" when $r$ ranges from .15 or .20 to .35 or .40; as being "markedly present" or "marked" when $r$ ranges from .35 or .40 to .50 or .60; as being "high" when it is above .60 or .70.

TABLE 11.—*Coefficients of correlation and regression equations.*

| Series of data used in computation. | Coefficients of correlation. | | | Regression equations. | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 100 instructors. | | 87 instructors. | | 76 instructors. | |
| | 100 instructors. | 87 instructors. | 76 instructors. | x= | y= | x= | y= | x= | y= |
| A. (x) Time spent in teaching work with (y) time spent in personal research | −0.04 | −0.06 | −0.05 | −0.07y | −0.02x | −0.10y | −0.04x | −0.08y | −0.03x |
| B. (x) Time spent in teaching work with (y) time spent in all noninstructional activities | −0.36 | −0.20 | −0.11 | −0.37y | −0.35x | −0.22y | −0.18x | −0.13y | −0.09x |
| C. (x) Time spent in teaching work with (y) time spent in noninstructional activities, exclusive of personal research | −0.34 | −0.21 | −0.07 | −0.35y | −0.33x | −0.26y | −0.17x | −0.11y | −0.04x |
| D. (x) Time spent in noninstructional activities, exclusive of personal research, with (y) time spent in personal research | −0.18 | −0.14 | −0.10 | −0.32y | −0.10x | −0.19y | −0.10x | −0.10y | −0.10x |
| E. (x) The sum of the time spent in teaching work and in noninstructional activities, exclusive of personal research, with (y) time spent in personal research | −0.16 | −0.16 | −0.11 | −0.32y | −0.08x | −0.32y | −0.08x | −0.20y | −0.06x |

The correlation between time spent in teaching work and that spent in personal research is therefore "negligible." That is to

[1] As has already been stated, in this group of 76 are included the two instructors who, although carrying a full teaching load, by agreement with the university perform other services for it during their working time not spent in teaching. Although they should not properly be in this group in the computation of the coefficient of correlation between teaching time and personal research, they are properly a part of it for some of the other coefficients computed, and to keep the groups identical, they are here included. Their presence affects the coefficient only slightly, invalidating no conclusions.

[2] Rugg, H. O. Statistical Methods Applied to Education. Houghton Mifflin & Co., p. 256.

say, an instructor who devotes a relatively large amount of time to teaching is almost as likely to devote a relatively large amount as he is to devote a relatively small amount of time to personal research; and, again, one who devotes a relatively small amount of time to teaching is almost as likely to spend a relatively small amount of time as he is to devote a relatively large amount of time to personal research.

It would be unwise and unfair to pass final judgment on the condition just described or to recommend on the basis of the findings so far mentioned an administrative practice for the adjustment of the teaching schedule that would be designed to promote research economically, without first giving consideration to the relationships between time spent in teaching and the remaining component of the total working load, the time spent in noninstructional activities exclusive of research, either in combination with the time spent in personal research or alone. When there are three components of a working load it is evident that a consideration of the relationships of two of them can not be complete if the relationships of the third are ignored. If a high negative coefficient of correlation should be found between the time spent in teaching and the time spent in all noninstructional activities (including both personal research and other noninstructional activities), our conclusion as to the negligibility of the relationship between teaching time and research time would be in considerable part invalidated. However, the coefficients for these two series of data, as set down in Table 11 under B, are seen to be small, although somewhat larger than for time spent in teaching and time spent in personal research alone. While the correlation is "present but low" when the data for all instructors, including deans, librarians, heads of departments, etc., are included in the computation, it drops to "negligible" when only full-time instructors without large and specially assigned administrative or other functions are included. Almost identical coefficients are found when time spent in teaching work and time spent in noninstructional activities, exclusive of personal research, are introduced in the computation (C in Table 11), which seems to indicate that such correlation as is found under B must be largely attributable to time spent in noninstructional activities exclusive of research. Furthermore, the correlations are highest when administrative officers and those with other specially assigned functions are included and most nearly negligible when they are excluded.

This point of possible weakness of the conclusion as to the almost negligible relationship between teaching time and personal research has been further pursued by obtaining the measure of the relationship between the two other sets of data—those given under D and E in the table. The former set gives the measures of correlation of

time spent in noninstructional activities exclusive of personal research with time spent in personal research. All three coefficients are so low as to show the correlation to be "negligible" and to prove these two components of the working load to be far from mutually exclusive. The latter set gives the correlations between ($x$) the sum of the time spent in teaching work and in noninstructional activities exclusive of personal research and ($y$) time spent in personal research. Here we see that when the coefficient of correlation is computed for the time spent in all activities (teaching, administration, office hours, etc.), exclusive of personal research and time spent in personal research, there results again a small negative coefficient; when the total working load is divided into these two parts, they are seen to be only to a slight extent mutually exclusive.

The regression equations of Table 11, introduced in order to give a somewhat fuller description of the relationships between the components of the total working load, also give support to the general conclusion drawn. The method of reading them from the table is as follows: For the two series of data under A for all the 100 instructors, these equations are $x=0.07y$, and $y=0.02x$. These equations may be said to signify that as the amount of time spent in teaching work increases by a unit of time, the time spent in personal research tends to decrease by only 0.07 of such unit; and that as the time spent in personal research increases by one unit, the time spent in teaching work tends to decrease by only 0.02 of a unit. A glance at the remaining equations will make clear that in no instance is there even a remote approach to equality in the values of $x$ and $y$. In most cases they are nearer equality when data for all instructors, including deans, librarians, heads of other than one-man departments, etc., are introduced into the computation than when data for those only who have no large specially assigned administrative or other functions are included. Even in these cases an increase of one hour in $x$ does not tend to bring a decrease in $y$ appreciably above a third of an hour.

Because there are three series of data involved—viz, (1) time spent in teaching, (2) time spent in personal research, and (3) time spent in other noninstructional activities—it has been possible to extend this study of the relationship between them by a method of computation of multiple correlation demonstrated by Yule.[1] The coefficients of correlation obtained by this method are as follows:

[1] Yule, G. U. Introduction to the Theory of Statistics. London, Charles Griffin & Co., pp. 238–241.

One hundred instructors—

$r_{12.3} = -.11$
$r_{13.2} = -.35$
$r_{23.1} = -.21$

Eighty-seven instructors—

$r_{12.3} = -.09$
$r_{13.2} = -.22$
$r_{23.1} = -.16$

Seventy-six instructors—

$r_{12.3} = -.06$
$r_{13.2} = -.08$
$r_{23.1} = -.10$

The regression equations are as follows:

One hundred instructors—

$x_1 = -.19_{x2} - .37_{x3}$
$x_2 = -.06_{x1} - .12_{x3}$
$x_3 = -.34_{x1} - .34_{x2}$

Eighty-seven instructors—

$x_1 = -.15_{x2} - .28_{x3}$
$x_2 = -.06_{x1} - .12_{x3}$
$x_3 = -.17_{x1} - .20_{x2}$

Seventy-six instructors—

$x_1 = -.09_{x2} - .12_{x3}$
$x_2 = -.04_{x1} - .10_{x3}$
$x_3 = -.05_{x1} - .10_{x2}$

It is seen at once that the coefficients are hardly appreciably larger than those found by means of the Pearson formula for any two series. Nor, in the light of the regression equations, except in some of the instances where administrative officers and other instructors who have special additional activities assigned them are included, must we modify the conclusions which our findings up to this point are compelling. The interpretation of these equations may be illustrated by reading the first one as follows: When data for all the 100 instructors are included in the computation, for each unit of increase in the amount of teaching time, there is a tendency to a decrease of 0.19 unit and 0.37 unit, respectively, in the amount of time spent in personal research and the amount spent in noninstructional activities other than research. Thus interpreted, the first and third equations—notably the latter—for the entire group of 100 instructors show an appreciable relationship between the components. But this diminishes—in fact, almost disappears—as we exclude from the computation the data for those instructors with specially assigned administrative or other functions.

As the facts that have been cited discover no such intimate causal relationship between the components of the working load as is implied by those who advocate a general reduction in the teaching schedule in a university in order to encourage research, it should be clear that research would not be generally encouraged by such a reduction. No doubt a general reduction would result in a larger total amount of time spent in research in a university, as it is to be expected that those instructors inclined toward research would devote more time to it if their teaching schedules would permit. But, manifestly, this would be a most uneconomical method of encouragement. What would seem to be a much more economical and practical method is the reduction of the teaching schedule for individual instructors who have demonstrated their inclination toward and ability in research by some measure of productivity in spite of a normal teaching schedule. Such a reduction should be continued, of course, only as long as productivity continues. The decision upon such reduction, or continuance of the reduction after once being made, should rest with the head of the department in which the instructor teaches, the dean of his school or college, and the president of the university.

Although throughout these several pages devoted to a presentation and discussion of the coefficients of correlation and regression equations attention has been particularly directed to the significance to personal research of the relationships obtaining, it must have been obvious to the reader that those measures of relationship are not without significance for the problem of adjustments to be made for the third component of the working load, the noninstructional activities exclusive of personal research. A glance at the measures of relationship with a view to discovering their significance for the latter problem will convince the reader that the interpretation can not be essentially different from what has been said concerning the former. On this account, and because the recommendations made elsewhere in this study (pp. 58–59) are in harmony with these facts, they will be given no further consideration at this point.

*The normality of the week for which data were collected.*—Question 6 on sheet 1 of the questionnaire (see appendix) asks, "Has the week reported upon been a fairly normal one? If not, in what specific respects has it been exceptional?" Before leaving this part of the report dealing with the facts concerning the working load of members of the faculty of a university, some presentation of the trend of the answers to this question should be made for the bearing they have upon the validity of the study.

In answer to the first part of the question just quoted, 64 persons answered "no" and 34 "yes." Of the two remaining, one said there is "no such thing" as a normal week and the other neglected to

answer. Unfortunately, the second portion of the question was so put that it was often far from clear whether the abnormality, if any, was in the direction of a lighter week, of a heavier one, or a normal one as to total load. being abnormal merely because of a shift of time from one component to another, as, e. g., less time spent in teaching work and more devoted to research. Despite this difficulty of interpretation, on the basis of the inner testimony of the answers, they were classified as follows: Of the 64 who reported the week as abnormal, (*a*) for 31 it was or was probably below normal, (*b*) for 6 it was or was probably above normal, (*c*) for 23 it was or was probably normal as to total working load, but abnormal because of a shift of time from one component to another, while (*d*) for 4 it was impossible to make any sort of conjecture as to the nature of the abnormality. By adding those under (*b*) and (*c*) in this subclassification to the 34 who affirmed the normality of the week, we have a total of 63 for whom the opinion as to the normality of the week was that the working load for the week was probably as great or greater than usual, as against 31 for whom it may have been less than usual. The testimony of the answers to this question thus seems to point toward a week to some extent under normal. However, the writer is inclined not to accept at its full value such an interpretation. Other than for a few members of the faculty carrying light teaching schedules at this time of year, in order to balance with a very heavy schedule during short courses no longer in session at the time reported upon, and for a few whose classes were so hard hit by the student exodus in the military emergency of the spring of 1917 that there were no students left in these classes, there could not have been many whose working load was notably diminished. The week was abnormal, certainly, but the abnormality consisted not so much in the diminished working load as in the general disturbance of a military crisis. Faculty members did not cease their work. Furthermore, it should be remembered that these opinions are merely opinions. Few or no members of a faculty regularly take such an account of "time spent" as was required for our questionnaire, so that they could have had nothing more than a general impression—not figures, certainly—upon which to base a comparison from which to derive the opinion asked for. And, as has already been pointed out, because of the poor statement of the question they are most often opinions on normality in general and not specifically normality of the working load. After all things are considered, and after canvassing the answers to this question very carefully, one is not left with the impression that the week was a notably exceptional one as to the amount of time spent in all professional activities.

## C. THE FACTORS DETERMINING THE TEACHING LOAD IN A UNIVERSITY.

*The factors investigated.*—In giving thought to the problem of investigating the time consumed in connection with classroom instruction it may at once occur to the reader that this factor is itself determined by what may be designated as subfactors, and that, in framing a questionnaire which is planned to secure data bearing on the total time expenditure, this questionnaire should be so devised as to secure data from which the presence and influence of such subfactors may be analyzed. Such has been the effort in the present instance. The hypothetical subfactors (which will hereafter be referred to as factors) whose possible influence the questionnaire and the study based upon the responses to it were designed to discover are the following:

(*a*) The department or *subject*. It is frequently contended by instructors that the subject taught is influential in determining one's teaching load. Horizontal column 1 on sheet 2 was introduced to assist in analyzing the effect of this factor.

(*b*) *Previous experience or inexperience with the work* is often alleged to be a factor; to teach courses new to the instructor, it is said, requires more time than to teach courses which one has already conducted. To make it possible to search out its influence, question 4 on sheet 2 was introduced.

(*c*) *Elementary or advanced character of the work*, i. e., in what year or years the course is normally taken. We are often told that courses taken by students who are freshmen or sophomores take less time than those taken by juniors and seniors, and that the latter again require less time than graduate courses. Question 5 (sheet 2) inquires into this.

(*d*) *Size of class.*—Horizontal column 6 calls for the enrollment during the semester, and is thus directed to find such influence as this factor may have.

(*e*) The influence of the *mode of presentation*, e. g., recitation, lecture, laboratory, etc., is sought for by answers to Nos. 7, 9, 11, 13, 15, 17, 19, and 21.

(*f*) The discovery of the effect of *repetition of courses in concurrent sections* is made possible by the requests (sheet 1, *d*) that "if the same preparation suffices for two or more sections of the same course, distribute the time in equal parts to each of the sections," and (*c*) to "make a report for each course or section for which you have teaching responsibility."

(*g*) Having the instructors' names and knowing their *rank*, will help in evaluating the latter as a factor.

*The unit of instruction used.*—The unit of instruction used in the effort to analyze the influence of the hypothetical factors named is what is commonly known as the *clock hour*. This is particularly convenient because daily programs in higher institutions are usually planned in full clock-hour units or multiples of full clock hours.[1] For the purpose in hand the clock hour has distinct advantages over two other units that have sometimes been used or suggested, the *student hour*, defined by Buckingham[2] as "one student taught one hour a week for a semester," and the *credit hour*, which is the "counter" used in totaling the credit received by the student. The student hour may be advocated for use in attacking the problem of educational finance in a higher institution. It may be that for this purpose, as suggested by Buckingham,[3] it is the best unit so far devised. Since we are here only concerned with the problem of the proper method of determining the teaching load, despite the fact that this teaching load may have important bearings upon the problem of cost, decision upon this point is not within the province of the present investigation. The reader has probably noted that the investigator is not leaving out of account the possible influence of the number of students ("size of class") which the student hour is designed to recognize, but that it is merely one of a number of hypothetical factors to be investigated by means of the clock-hour unit. The use of the credit hour as the unit for investigation is at once seen to be inadequate when attention is called to the fact that its use would tend to make it impossible to analyze the influence of the mode of presentation (recitation, lecture, laboratory, etc.). As further justification for the use of this clock hour as the unit of investigation will be found in the facts themselves, there is little need here of defending it at greater length.

The particular procedure in using the clock hour as the unit in analyzing the influence of the several factors has been to charge up to each clock hour of instruction all work done in connection with it, both within and without the class period. This has been made possible by the organization of the second sheet of the questionnaire (see appendix). For instance, under rubric 7, the instructor was asked to report the hours of recitation in a course he was teaching and, under rubric 8, the amount of time spent in preparation for these hours of recitation. Each pair of succeeding rubrics to and including rubric 22 calls for a similar report on another mode of presentation. Rubric 23 asks for a report on the time spent in the

[1] Of course, a small portion of the hour—5 to 10 minutes—is allowed to students for moving from one classroom to another or from one building to another.

[2] Buckingham, B. R. Critical Present-Day Issues in the Administration of State and Higher Education. *School and Society*, 6 (Dec. 22, 1917): 722.

[3] Loc. cit.

"correction of written and other work" in connection with the course, and rubric 24 for time spent "in other work for the courses listed not reported elsewhere." Thus, all time spent in connection with a course was reported. From these reports the total amount of work per clock hour of each mode of presentation for each course was computed. Usually it was a very simple matter to make such a computation and to distribute to each clock hour its proper portion of additional work reported under rubrics 23 and 24. Sometimes such distribution required the use of careful judgment, as in the cases where two or more modes of presentation were reported for a single course. In a few instances, where no safe judgment could be arrived at, the figures for a course were omitted in assembling the tables presented in this part of the report. Moreover, in assembling the tables no figures were introduced for clock hours of instruction for which the person reporting them was not responsible for all the work.[1] What prompted such exclusion was the aim to have the final figures representative of the clock hour of instruction when its full load was being carried by an instructor. From these amounts of work, in hours for each clock hour, the averages[2] of the numbers of hours of work per clock hour of instruction were readily computed and these are presented in the tables which follow. These averages are computed from the reports of 106 members of the faculty of the University of Washington—i. e., approximately 60 per cent of all teaching members. Altogether, $1,684\frac{7}{12}$ clock hours of instruction are involved.

[1] See direction (c) on sheet F of the questionnaire reproduced in the appendix.

[2] The average was used throughout this study because it is the measure of central tendency which is most influenced by extreme items in an array. It is believed that extremes should carry their full influence in an investigation of this nature.

TABLE 12.—*Average number of hours of work per clock hour of instruction by mode of presentation and by subject and subject group:*

| Subject, department, or group. | Number of instructors reporting. | Recitation. | | Lecture. | | Mixed lecture and discussion. | | Oral quiz. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Number of clock hours. | Average number of hours per clock hour. | Number of clock hours. | Average number of hours per clock hour. | Number of clock hours. | Average number of hours per clock hour. | Number of clock hours. | Average number of hours per clock hour. |
| *Foreign language* | 23 | 263 | 1.77 | 15 | 4.72 | 27 | 2.75 | 7 | 1.98 |
| Chinese | 1 | 4 | 1.58 | | | | | | |
| French | 7 | 74 | 1.49 | 10 | 3.32 | 5 | 1.48 | 2 | 3.50 |
| German | 6 | 106 | 1.91 | 1 | 3.83 | 10 | 2.38 | | |
| Greek | 2 | 15 | 1.89 | | | 14 | 2.67 | 3 | 1.28 |
| Italian | 1 | 4 | 1.79 | | | | | | |
| Latin | 3 | 32 | 1.83 | | | 3 | 2.10 | 2 | 1.50 |
| Scandinavian | 1 | 12 | 1.51 | 1 | 4.17 | 3 | 2.33 | | |
| Spanish | 4 | 56 | 2.14 | 3 | 9.89 | 2 | 1.75 | | |
| *English* | 7 | 36 | 1.79 | 5 | 1.25 | 19 | 2.22 | | |
| *Mathematics* | 8 | 42 | 1.61 | 10 | 3.56 | 37 | 1.86 | 3 | 1.72 |
| *Social studies* | 5 | 7½ | 2.00 | 15 | 4.38 | 29½ | 2.63 | 8 | 1.13 |
| Economics | 2 | 7½ | 2.00 | 2 | 6.33 | 20½ | 2.40 | 3 | 1.00 |
| History | 1 | | | 9 | 5.08 | | | 5 | 1.20 |
| Political science | 1 | | | 4 | 1.83 | | | | |
| Sociology | 1 | | | | | | | | |
| *Philosophy and psychology* | 4 | 9 | 1.83 | 11 | 2.48 | 9 | 3.11 | | |
| *Oriental* | 1 | | | 10 | 1.57 | 15 | 2.21 | 7 | 1.10 |
| *Education* | 4 | | | 6 | 1.94 | | | | |
| *Science* | 16 | 21 | 2.21 | 58 | 2.53 | 39 | 2.66 | | |
| Astronomy | 1 | 4 | 2.81 | 5 | 2.70 | 35 | 2.08 | 18 | 1.94 |
| Bacteriology | 1 | | | | | 1 | 1.25 | | |
| Botany | 3 | 2 | 1.75 | 13 | 2.00 | 5 | 1.77 | | |
| Chemistry | 3 | | | 18 | 2.69 | 6 | 1.69 | | |
| Geology | 2 | | | 2 | 4.00 | 2 | 2.75 | 8 | 1.44 |
| Physics | 4 | 15 | 2.11 | 13 | 3.73 | 19 | 2.16 | | |
| Zoology | 2 | | | 9 | 2.74 | 2 | 3.00 | 6 | 2.75 |
| *Home economics* | 4 | 5 | 1.00 | 5 | 1.80 | 9 | 2.09 | 4 | 1.73 |
| *Physical education* | 2 | 1 | 1.50 | 1 | 3.13 | | | | |
| *Journalism* | 1 | | | 8 | 3.06 | | | | |
| *Architecture* | 1 | | | 4 | 3.25 | | | | |
| *Art* | 1 | 10 | 1.52 | | | | | 11 | 1.00 |
| *Music* | 2 | 14 | 2.00 | 4 | 1.41 | 2 | 6.67 | | |
| *Engineering* | 13 | 24 | 2.00 | 9½ | 1.96 | 27 | 2.20 | 2 | 2.11 |
| Civil | 5 | 13 | 1.83 | | | 10 | 3.29 | | |
| Electrical | 3 | 2 | 1.58 | ½ | 1.50 | 12 | 1.80 | | |
| Mechanical | 5 | 9 | 2.36 | 9 | 2.02 | 5 | 1.00 | 2 | 2.11 |
| *Forestry* | 3 | 5 | 1.13 | 2 | 3.75 | 6 | 1.50 | | |
| *Mining* | 3 | ½ | 1.50 | 4½ | 1.72 | 8 | 3.77 | | |
| *Pharmacy* | 2 | 8 | 1.74 | 4 | 2.21 | | | 1 | 1.00 |
| *Library economy* | 3 | 1 | 2.67 | 2 | 4.01 | 4 | 4.40 | | |
| *Law* | 3 | 28 | 3.60 | | | | | | |
| Total | 106 | 475 | 1.89 | 174 | 2.98 | 257½ | 2.41 | 47½ | 1.62 |

TABLE 12.—*Average number of hours of work per clock hour of instruction by mode of presentation and by subject and subject group*—Continued.

| Subject, department, or group. | Scheduled conference. | | Seminar. | | Laboratory. | | Shop. | | Field. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number of clock hours. | Average number of hours per clock hour. | Number of clock hours. | Average number of hours per clock hour. | Number of clock hours. | Average number of hours per clock hour. | Number of clock hours. | Average number of hours per clock hour. | Number of clock hours. | Average number of hours per clock hour. |
| *Foreign language* | 6 | 1.17 | 4 | 2.40 | | | | | | |
| German | | | 2 | 3.24 | | | | | | |
| Greek | 5 | 1.10 | | | | | | | | |
| Scandinavian | 1 | 1.50 | | | | | | | | |
| Spanish | | | 2 | 1.51 | | | | | | |
| *English* | 15 | 1.14 | 113 | 2.27 | | | | | | |
| *Social studies* | 43 | 1.11 | 2 | 1.00 | | | | | | |
| Economics | 23 | 1.00 | | | | | | | | |
| Political science | | | 2 | 1.00 | | | | | | |
| Sociology | 2 | 1.25 | | | | | | | | |
| *Philosophy and psychology* | | | 2 | 2.05 | 2 | 1.67 | | | | |
| *Education* | 2 | 1.00 | 8 | 2.64 | | | | | | |
| *Science* | 2 | 2.65 | 2 | 2.75 | 164 | 1.26 | | | | |
| Astronomy | | | 2 | 2.75 | 12 | 1.19 | | | | |
| Botany | | | | | 28 | 1.13 | | | | |
| Chemistry | | | | | 30 | 1.17 | | | | |
| Geology | 2 | 2.65 | | | 24 | 1.35 | | | | |
| Physics | | | | | 39 | 1.37 | | | | |
| Zoology | | | | | 31 | 1.30 | | | | |
| *Home economics* | 7 | 1.00 | 2 | 1.50 | 40 | 1.30 | | | | |
| *Physical education* | 7 | 1.27 | | | 23 | 1.16 | | | | |
| *Architecture* | | | | | 1 | 1.00 | | | | |
| *Art* | | | | | 10 | 1.18 | | | | |
| *Engineering* | 3 | 1.00 | | | 176½ | 1.17 | 60 | 1.30 | | |
| Civil | | | | | 95 | 1.25 | | | | |
| Electrical | 3 | 1.00 | | | 30½ | 1.20 | | | | |
| Mechanical | | | | | 45 | 0.98 | 60 | 1.30 | | |
| *Forestry* | | | | | 4 | 1.11 | | | 60 | 1.17 |
| *Mining* | 3 | 1.00 | | | 46 | 1.07 | 3 | 1.00 | | |
| *Pharmacy* | | | | | 12 | 1.19 | | | | |
| *Library economy* | | | | | 14 | 1.33 | | | | |
| *Law* | | | | | 6 | 2.26 | | | | |
| Total | 79½ | 1.18 | 29½ | 2.21 | 498½ | 1.23 | 63 | 1.28 | 60 | 1.17 |

1. *The mode of presentation as a factor.*—The influence of the mode of presentation as a factor may be seen at a glance by reference to Table 12, which presents in the lowest horizontal column the total number of clock hours of each mode of presentation (recitation, lecture, mixed lecture and discussion, etc.) and the average number of hours of work both in classroom and out per clock hour of such instruction. Striking differences between the several modes of presentation are at once manifest. While the average number of hours of work per clock hour of instruction for recitation is 1.89, for a clock hour of lecture it is approximately an hour greater. In fact, lecture is seen to be the most arduous of the modes of presentation. Mixed lecture and discussion is almost midway between recitation and lecture. Oral quiz requires a somewhat smaller time expenditure per clock hour than does recitation. The time investment in scheduled conference seems to be almost limited to the clock hour of conference itself; i. e., there is an expenditure of but 0.18 of an hour in

addition to the clock hour of instruction. Seminars on an average require the expenditure of 2.24 hours of work per clock hour, ranging between recitation and lecture. Laboratory, shop, and field require about the same time investment as scheduled conference hours. We have in these figures support for some of the distinctions that have for many years been made in our rule of thumb methods of determining the teaching hours of instructors in higher institutions. But the question may well be raised as to whether, in the light of these facts, the systems of weighting in use have been just to all concerned, and whether they have recognized all of the important differences that are here discovered.

2. *The subject or subject group as a factor.*—Table 12 reveals also the influence of the subject or subject group as a factor. This may be seen by glancing down, e. g., the vertical column headed "Recitation." A clock hour of recitation in foreign language is seen to require an average of 1.77 hours of work. The same is essentially true of English. A clock hour of recitation in mathematics requires slightly less time. The numbers of clock hours of recitation upon which the averages for the social studies and for philosophy and psychology are based, are probably too small to furnish valid comparisons. The departments of oriental literature and education report no recitation work. One or the other of the two reasons just given must exclude from comparison as to this mode of presentation the following subjects: Home economics, physical education, journalism, architecture, forestry, mining, pharmacy, and library economy. A clock hour of recitation in the sciences is seen to require more hours of work than any of those so far considered. Art requires less time than any of the groups, music and engineering slightly less than the sciences, and law emphatically more—in fact, almost twice the average for all subjects.

The reader will find it profitable to glance down each of the remaining vertical columns of this table in the same manner as has just been demonstrated for the recitation column, noting differences in the average number of hours of work for each of the subjects. In doing so it is probably safest to give little heed to differences where the number of clock hours used in computation has been less than 10, as such small numbers of hours are more likely to give unrepresentative averages than are larger numbers. The columns reporting the facts for oral quiz, scheduled conference, seminar, shop, and field contain but a small proportion of instances of subjects where 10 or more clock hours are reported, and will therefore reveal less as to the influence of the subject in determining the teaching load than do the remaining columns of the table. But even these

contain some facts of significance, which, with those of the other columns, point to the advisability of giving the subject or subject group recognition as a real factor in determining the teaching load.

TABLE 13.—*Average number of hours of work per clock hour of instruction by mode of presentation and by the division in which the work is normally taken.*

| Mode of presentation. | Lower division. | | Upper division. | | Graduate division. | |
|---|---|---|---|---|---|---|
| | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. |
| Recitation | 305½ | 1.74 | 103½ | 2.13 | 19 | 2.99 |
| Lecture | 58 | 2.82 | 47½ | 3.03 | 13 | 3.84 |
| Mixed lecture and discussion | 65½ | 1.84 | 107 | 2.48 | 11 | 3.69 |
| Oral quiz | 27½ | 1.64 | 4 | 1.83 | 2 | 3.50 |
| Scheduled conference | 32½ | 1.07 | 12 | 1.28 | 6 | 1.08 |
| Seminar | | | | | 21½ | 2.75 |
| Laboratory | 788 | 1.26 | 198½ | 1.17 | 11 | 1.35 |
| Shop | 63 | 1.28 | | | | |
| Field | | | 12 | 1.17 | | |

3. *The elementary or advanced character of the work as a factor.*—Table 13 presents the results of an effort to analyze the influence of the elementary or advanced character of the work as a factor. Reference to sheet 2 of the questionnaire used in the investigation will show that the "year or years in which the course is normally taken" were called for. The instructor was directed to designate (see No. 5 and footnote on sheet 2 of the questionnaire) the year or years by number, e. g., "1 for freshmen, 2 for sophomores, 5 for graduate courses and professional courses requiring four years of previous training, etc." As some courses drew their students normally from more than one class, the answers of the instructors were given in combinations of numbers, as 1–2, 2–3, 1–4, or 3–5. Under "Lower division" in Table 13 have been included courses reported as 1, 2, or 1–2; under "Upper division," 3, 4, and 3–4; under "Graduate," 5 and 5–6. In assembling the materials for this table, courses reported with other numbers, e. g., 2–3, 1–4, 3–5, 4–5, etc., were excluded. The figures for somewhat less than 300 of the total of 1,684 seven-twelfths clock hours of instruction included in the present study were omitted from this table. That is to say, the figures for slightly more than 1,300 clock hours of instruction have been introduced into the effort to discover the influence of the factor under consideration.

For the recitation mode of presentation, the average number of hours of work per clock hour of instruction in the lower division is

1.74; in the upper division, 2.13; in the graduate courses, 2.99. We note at once in the figures for this mode of presentation a definite progression in the amount of work required per clock hour of instruction as we proceed from courses in the lower division to those of graduate caliber. This is also true for the three succeeding modes of presentation in the table, lecture, mixed lecture and discussion, and oral quiz, although the numbers of clock hours involved in the computation of the average number of hours of work in the mode last named in the columns for upper-division and graduate work are so few as to justify little confidence in the findings as to this mode of presentation in advanced work. As the mode last named seems to be seldom used in upper-division and graduate work, this weakness is a matter of but slight concern. Scheduled conference, while requiring practically no time outside the clock hour of instruction itself in the lower division, requires approximately one-fourth of an hour of such additional time in the upper division. For this mode in graduate work we are again confronted by a number of clock hours too small to give confidence in the average number of hours of work computed and introduced in the table. As the seminar mode of presentation is almost exclusively used in graduate classes, no opportunity or need appears for comparison with upper or lower division figures for this mode. The laboratory mode of presentation does not seem to require more work per clock hour of instruction in the upper division than in the lower division, as do most of the preceding modes. As the averages in this mode for the lower and upper divisions have been computed from almost 200 clock hours of instruction each, this finding is well established. Laboratory work of graduate caliber seems to require slightly more time than that of undergraduate grade. The figures for shop and field work are so near those for laboratory work that they hardly merit separate attention and, as far as the influence of the factors under consideration is concerned, may be similarly recognized in fixing the teaching load of members of the instructional staff. Thus, the evidence of the influence of this factor of the elementary or advanced character of the work is clear; injustice would result from an apportionment of clock hours of instruction to members of a department staff without regard to it.

TABLE 14.—*Number of hours of work per clock hour of instruction by mode of presentation and by the instructors' previous experience or inexperience with the course.*

| Mode of presentation. | First-time work. | | Non first-time work. | | All work. | |
|---|---|---|---|---|---|---|
| | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. |
| Recitation | 83 | 2.07 | 389½ | 1.86 | 473 | 1.89 |
| Lecture | 36½ | 4.48 | 137½ | 2.58 | 174 | 2.98 |
| Mixed lecture and discussion | 36½ | 3.07 | 221 | 2.30 | 257½ | 2.41 |
| Oral quiz | 4 | 1.65 | 43½ | 1.62 | 47½ | 1.62 |
| Scheduled conference | 5½ | 1.00 | 74 | 1.18 | 79½ | 1.18 |
| Seminar | 6 | 3.21 | 23½ | 1.99 | 29½ | 2.24 |
| Laboratory | 35½ | 1.33 | 462½ | 1.22 | 498 | 1.23 |
| Shop | | | 63 | 1.28 | 63 | 1.28 |
| Field | | | 60 | 1.17 | 60 | 1.17 |

4. *Previous experience or inexperience with the course as a factor.*—That the instructor's previous experience or inexperience with the work of a course is a real factor in determining his actual teaching load may be seen by a brief examination of the figures assembled in Table 14. This table presents the average number of hours of work per clock hour of instruction when the work is classified as to "first-time" and "nonfirst-time" work, classes corresponding to the two kinds of answers that were made to question 4 on the second sheet of the questionnaire reading as follows: "Is this the first time you have taught the course?" Work "new" to the instructor requires more time per clock hour than does work that he has previously taught. This is true for all modes of presentation for which we have figures that allow a comparison except scheduled conference. For this mode and for oral quiz the small numbers of "first-time" clock hours of instruction forbid assurance for conclusions that may be drawn. The ratios that the "first-time" averages bear to the "nonfirst-time" averages are not the same for all modes of presentation, as may be seen from the following: For recitation this ratio is 1.11:1.00; for lecture, 1.73:1.00; for mixed lecture and discussion, 1.33:1.00; for seminar, 1.61:1.00; for laboratory, 1.09:1.00. For the recitation and laboratory modes of presentation the difference seems to be less marked than for lecture, mixed lecture and discussion, and seminar.

5. *The rank of the instructor as a factor.*—Table 15 presents the average number of hours of work per clock hour of instruction by rank of instructors—i. e., the average number of hours of work per clock hour for instructors, for assistant professors, for associate professors, and for full professors. An examination of these averages will

fail to discover any consistent influence of rank upon the time consumed in carrying the work. For recitation the average drops from instructor to assistant professor and again to associate professor, but rises again to its highest point for the full professor. For lecture there is no evidence of such influence, as the averages are higher for instructor and associate professor than for assistant professor and professor. For mixed lecture and discussion the averages are practically equal for all ranks. For none of the remaining modes of presentation for which comparisons are possible does any consistent influence of rank make its appearance. Such differences as are evident must either be purely casual or due to factors other than that of the rank of the instructor—more probably the latter.

TABLE 15.—*Average number of hours of work per clock-hour of instruction by mode of presentation and by the rank of the instructor.*

| Mode of presentation. | Instructors. | | Assistant professors. | | Associate professors. | | Professors. | | All work. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. |
| Recitation | 158½ | 1.92 | 138½ | 1.78 | 54 | 1.66 | 124 | 2.27 | 475 | 1.89 |
| Lecture | 38½ | 3.95 | 36½ | 2.85 | 25 | 3.72 | 74 | 2.28 | 174 | 2.98 |
| Mixed lecture and discussion | 66½ | 2.37 | 83 | 2.36 | 37 | 2.50 | 71 | 2.46 | 257½ | 2.41 |
| Oral quiz | 21 | 1.52 | 13½ | 1.57 | ..... | ..... | 13 | 1.84 | 47½ | 1.62 |
| Scheduled conference | 13½ | 1.00 | 43 | 1.37 | ..... | ..... | 23 | 1.13 | 79½ | 1.18 |
| Seminar | ..... | ..... | 9 | 2.32 | 6 | 2.82 | 14½ | 1.64 | 29½ | 2.24 |
| Laboratory | 179½ | 1.26 | 187 | 1.23 | 73 | 1.09 | 58½ | 1.29 | 498½ | 1.23 |
| Shop | 60 | 1.30 | 3 | 1.00 | ..... | ..... | ..... | ..... | 63 | 1.28 |
| Field | ..... | ..... | 60 | 1.17 | ..... | ..... | ..... | ..... | 60 | 1.17 |

6. *Repetition in concurrent sections as a factor.*—Table 16 was assembled for the purpose of investigating the influence of repetition of courses in parallel sections upon the instructor's teaching load. Repetition here means repetition in concurrent sections by the *same* instructor, not by different instructors. In the columns headed "Repeated" are set down the averages of the numbers of hours of work done in connection with a clock hour of instruction in such repeated sections, and in the columns headed "Nonrepeated" the averages of the numbers of hours of work done in connection with a clock hour of instruction of courses or work not being presented by the instructor in such parallel sections. In the computation of these averages no figures for work in subject groups containing no repeated sections were used, as it was believed that these might improperly affect the

results. To avoid undue influence of the factor already designated as the "elementary or advanced character of the work," the comparisons are made by the divisions in which the work is found, as "Lower division" and "Upper division," but the averages for the totals of these two divisions have also been introduced ("Both lower and upper division"). Because of the frequent statement in college and university circles to the effect that repetition tends to lighten the teaching load, one is not a little surprised that these figures disclose no consistently appearing or notable differences between the averages for repeated and nonrepeated work. In fact, the differences found are more frequently in favor of the nonrepeated than of the repeated work. Only in the lecture and mixed lecture and discussion modes of upper-division work do we find the anticipated difference. In the former instance, while large, we can have but little confidence in the difference, because only 6 clock hours were involved in the computation of the average for repeated work. In the latter case the difference is only 0.2 of an hour. Partial explanation of this absence of a marked difference in favor of repeated work may be found in the policy in this institution—common to many higher institutions—of avoiding much repetition of the sort under consideration in the assignment of courses. It is to be noted that even in the lower division there is a relatively small proportion of repeated work. Examination of the original questionnaires shows that such repetition as appears is usually two-section repetition, three-section and four-section repetition being very infrequently reported. Furthermore, the numbers of hours of work per clock hour of instruction include *all* work done in connection with a course, comprehending the reading of papers as well as preparation. While time spent in preparation per clock hour of instruction may be reduced by repetition, this would not be true of the reading of papers. On the basis of the findings of the present investigation, there seems to be no justification, with conditions similar to those obtaining at the time the data were gathered, for admitting repetition as a significant factor in fixing teaching loads for members of the faculty of a university.

TABLE 16.—*Average number of hours of work per clock hour of instruction by mode of presentation and by repetition or nonrepetition of the work.*

| Mode of presentation. | Lower division. | | | | Upper division. | | | | Both lower and upper division. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Repeated. | | Non-repeated. | | Repeated. | | Non-repeated. | | Repeated. | | Non-repeated. | |
| | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. |
| Recitation | 701 | 2.58 | 221 | 1.72 | 12 | 3.00 | 62 | 2.01 | 823 | 2.61 | 286 | 1.79 |
| Lecture | 14 | 3.17 | 33 | 2.62 | 6 | 1.91 | 30 | 3.31 | 20 | 2.80 | 63 | 2.95 |
| Mixed lecture and discussion | 193 | 2.06 | 36 | 1.72 | 16 | 2.22 | 81 | 2.12 | 351 | 2.13 | 117 | 2.20 |
| Oral quiz | 12 | 1.88 | 7 | 1.37 | | | | | | | | |
| Laboratory | 78 | 1.26 | 97 | 1.26 | 114 | 1.19 | 92 | 1.16 | 1194 | 1.21 | 180 | 1.21 |

7. *Size of class as a factor.*—The last of the hypothetical factors in the determination of the teaching load whose influence this study was aimed to discover is the size of the class. Before turning our attention to the averages presented in Table 17, which essays an analysis for this factor, it is advisable to point out the weaknesses of the data from which they have been computed. Question 6 of sheet 2 of the blank inquiry (see appendix) calls for the enrollment of each class and section during the semester. Under fully normal conditions as to class enrollments, the answers to this question would have served adequately the purpose under consideration. At the time the investigation was originally projected this would have been true; but, owing to the large exodus of students that took place during the spring of 1917 in response to the war emergency and before the questionnaire was sent out to the members of the faculty for those classes enrolling large proportions of male students especially, the enrollment during the semester would not in many cases correspond to the numbers in the same classes during the school week of May 14–19 upon which instructors were asked to report. The incidence of the withdrawals from all courses and classes obviously can not be assumed to be proportionate to the enrollment for the semester. There is evidence that a few advanced classes were discontinued because of a loss of all students, while there were other classes that suffered the loss of not a single student. We have here, therefore, a source of weakness that must cast a large measure of doubt upon the dependability of findings that concern the average number of hours of work per clock hour of instruction as influenced

by size of class. Another source of weakness is found in the fact that, while there were a number of large classes, they were not sufficiently numerous to make possible satisfactory comparisons for the purpose in hand. In the first effort at this analysis the classifications of size of class used were 1–14, 15–29, 30–44, 45–59, 60–74, etc., advancing by 15 students for each larger classification. While there were usually fairly large numbers of clock hours of instruction in each of the first three groups, the distribution in many of the upper groups was so attenuated as to make comparisons both impossible and impracticable.

TABLE 17.—*Average number of hours of work per clock hour of instruction by mode of presentation and by size of class.*

| Mode of presentation. | Lower division. | | | | Upper division. | | | | Both lower and upper division. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Less than 30 in class. | | 30 or more in class. | | Less than 30 in class. | | 30 or more in class. | | Less than 30 in class. | | 30 or more in class. | |
| | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. | Number of clock hours of instruction. | Average number of hours of work per clock hour of instruction. |
| Recitation | 227 | 1.76 | 59½ | 1.88 | 91½ | 1.86 | 14 | 2.12 | 318½ | 1.79 | 73½ | 2.12 |
| Lecture | 31 | 2.58 | 27 | 2.76 | 39½ | 2.96 | 10 | 2.78 | 70½ | 2.79 | 37 | 2.77 |
| Mixed lecture and discussion | 49 | 1.69 | 13½ | 2.93 | 69 | 2.25 | 34 | 2.52 | 118 | 2.02 | 47½ | 2.04 |

To be able to make any use of the data for the purposes of studying the influence of size of class it was necessary to retabulate them in two groups only—viz, for classes (*a*) of less than 30 and (*b*) of 30 or more. The results of this effort are presented in Table 17, which sets forth the averages by the division in which a course is taught and by mode of presentation. Figures for the graduate division are omitted, as there are few strictly graduate classes enrolling 30 or more students. Averages for the recitation, lecture, and mixed lecture and discussion modes only are included in the table because there were too few or no clock hours of instruction in the remaining modes on which to compute averages. For example, very few laboratory sections enroll 30 or more students.

Notwithstanding the weakness just indicated, large class enrollments are seen in Table 17 to add appreciably to the average amount of time spent in connection with a clock hour of instruction. This is shown in the averages for lower-division and upper-division work for the recitation and mixed lecture and discussion modes of pre-

sentation and in lower-division work for the lecture mode. In this table, where there are large numbers of clock hours of instruction involved, the differences between the averages are not very large. This is the case for the averages for recitation and lecture in the lower division, and mixed lecture and discussion in the upper division. The large differences are found in two of the three instances in which small numbers of clock hours of instruction have been used in the computation of the averages, viz, in mixed lecture and discussion in the lower division and in recitation in the upper division. The difference in favor of classes of 30 or more in upper-division lecture must also be explained by the small number of clock hours of lecture used in computing the average. (The column headed "Both lower and upper division," containing, as it does, the figures for all the work in both divisions, the averages for each of which are reported in the preceding columns of this table, is given no special attention in our discussion because the averages it contains must obviously be influenced by the factor we have called "the elementary or advanced character of the work.")

We may sum up the discussion of our investigation of the effect of size of class upon the teaching load by saying that it is a factor, but that, on account of the uncertainty of our figures on the size of classes at the time the investigation was made and the attenuation of the distribution of classes when grouped by size, no recommendation can be made as to how much recognition is to be given for large classes in fixing the teaching load of an instructor. It is the writer's opinion that the difference due to size of class is largely attributable to the difference in time spent in reading papers and correcting work handed in by students. If this is true, an appropriate recognition for large classes might be made after the making of a small supplementary investigation into time spent in reading and correcting papers in classes of different sizes.

## D. A METHOD OF ADJUSTING THE TEACHING LOAD IN A UNIVERSITY.

In preceding sections of this study we have presented the facts as to the total time spent in all professional activities by members of a university faculty, and the proportional distribution of this total time to teaching work, and to such noninstructional activities as personal research, other official duties for the university, and professional activities not otherwise reported. We have also analyzed out the influence on the clock hour of instruction of certain factors determining the teaching load of a member of the faculty. Our next task must be the application of the findings in these preceding portions of the investigation in a method of adjusting the teaching load that will

assure the university an approximately uniform amount of service by all members of its faculty and at the same time be just to them by not requiring much more service of some instructors than is required of others.

*Computing the weighted values of clock hours of instruction.*—The first step taken in the application of the findings of this investigation in a method of adusting the teaching load was the computation of a set of weighted values of clock hours of instruction—i. e., values into which has been introduced the influence of the several factors that have been found to affect the "total time consumed" in connection with a clock hour of instruction. These weighted values are presented in Tables 18–22. As will be seen in the following description of the procedure in computation, the only factor found to be notably influential which has been omitted is what we have termed the size of class. The reason for omitting it may be inferred from what has been said on page 44.

The detailed procedure in the computation of the weighted values of Tables 18–22 may be illustrated by describing how they were arrived at for foreign language, the first of the subject groups listed in Table 18. It may be seen from Table 12 that a total of 263 clock hours of the recitation mode of instruction were reported by the teachers of foreign language and that the average number of hours of work per clock hour of instruction was 1.77. Before it was possible to compute, e. g., the average number of hours of work for a clock hour of recitation in foreign language in the lower division, it was necessary to know the average year place of these 263 clock hours of recitation. This was found in the following manner:

*Average year place of clock hours of recitation.*

| (a) | (b) | (c) | (d) |
|---|---|---|---|
| Year or years normally taken. | Year place assigned. | Number of clock hours. | Product of (b) and (c). |
| 1 | 1 | 87 | 87 |
| 2 | 2 | 54 | 108 |
| 3 | 3 | 22 | 66 |
| 4 | 4 | 6 | 24 |
| 5 | 5 | 12 | 60 |
| 1–2 | 1½ | 43 | 64½ |
| 2–3 | 2½ | 7 | 17½ |
| 3–4 | 3½ | 20 | 70 |
| 1–3 | 2 | 2 | 4 |
| 2–4 | 3 | 4 | 12 |
| 3–5 | 4 | 3 | 12 |
| 1–4 | 2½ | 3 | 7½ |
| | | 263 | 532½ |

Average year place, 2.02.

In this illustration, the "year place assigned" is taken from the "year or years normally taken." For clock hours reported for years 1–2, this year place assigned is midway between 1 and 2 or 1½. Year place has been assigned by a similar method for clock hours reported for years 2–3, 3–4, 1–3, 2–4, 3–5, and 1–4. The average year place, obtained by dividing the total at the foot of column (*d*) by the total number of clock hours at the foot of column (*c*), is 2.02—for practical purposes, 2. That is to say, the average number of hours of work per clock hour of recitation in foreign language, 1.77, may be assumed to be the average for work normally taken by the student in his sophomore year. To compute the number of hours of work per clock hour of recitation in foreign language for the lower division for Table 18, we may proceed by the following proportion: $a_1 : a_2 = b : x$, where $a_1$ is the number of hours of work per clock hour of recitation for second-year courses for all subjects, $a_2$ is the number of hours of work per clock hour of recitation for second-year courses in foreign language, $b$ is the number of hours of work per clock hour of recitation in the lower division for all subjects, and $x$ is the number of hours of work per clock hour of recitation in the lower division in foreign language. The second term in our proportion is seen from our recent computation to be 1.77. The third term is seen in Table 10 to be 1.74. The first term is still needed for the computation of $x$, and this may be derived from the figures in Table 13 by the following procedure: Lower-division recitation for all subjects having a year place of 1½ [1]—midway between 1 and 2—requires, as has just been pointed out, an average time expenditure of 1.74 hours. Upper-division recitation for all subjects from the same table having a year place of 3½—midway between 3 and 4—requires an average time expenditure of 2.13 hours. Second-year work, being one-half year in advance of the year place of lower-division work and 1½ years below upper-division work, should require on the average, in addition to the number of hours per clock hour of lower-division recitation, one-fourth of the difference in time between that required for upper and lower division recitation—i. e., 1.74 plus ¼ (2.13–1.74), or 1.84. Introducing this as $a_1$ into our proportion, we have—

$$1.84 : 1.77 = 1.74 : x$$
$$1.84\,x = 3.08$$
$$x = 1.67$$

This value of $x$, the number of hours of work per clock hour of recitation in foreign language in the lower division, is to be found under the column headed "All work" in Table 18.

[1] Actual computation of the average year place of recitation work in the lower division that has entered into the computation of the average number of hours reported in Table 18 finds it to be 1.49; that is to say, for all practical purposes this figure may be safely used. The same is true for the other modes of presentation, as well as for the average year place of 3½ for upper-division work.

The method of recognizing in the weighted values the influences of the factor previous experience or inexperience with the work needs still to be presented. We have in Table 14 figures to indicate that the ratio of the average number of hours of work per clock hour of recitation for all work to the average number of hours of work per clock hour of recitation for first-time work is 1.89:2.07. Assuming that this relationship remains constant irrespective of the division—upper, lower, or graduate—in which the work is found, we resort again to a proportional equation, $c_1 : c_2 = d : x$, in which $c_1$ is the average number of hours of work per clock hour of recitation for all work, $c_2$ is the number of hours of work per clock hour of recitation for all first-time work, $d$ is the average number of hours of work per clock hour of lower-division recitation, and $x$ is the number of hours of work per clock hour of recitation for lower-division first-time work. We have—

$$1.89 : 2.07 = 1.74 : x$$
$$1.89\ x = 3.60$$
$$x = 1.91$$

This weighted value for first-time lower-division work will be found at the foot of Table 18. By means of a similar proportional equation we find the weighted value of nonfirst-time recitation in the lower division to be 1.71.

TABLE 18.—*Weighted values for clock hours of recitation.*

| Subject or group. | Lower division. | | | Upper division. | | | Graduate. | | |
|---|---|---|---|---|---|---|---|---|---|
| | First-time work. | Non-first-time work. | All work. | First-time work. | Non-first-time work. | All work. | First-time work. | Non-first-time work. | All work. |
| Foreign language | 1.83 | 1.64 | 1.67 | 2.24 | 2.02 | 2.05 | 3.15 | 2.83 | 2.88 |
| English | 1.96 | 1.76 | 1.79 | 2.40 | 2.16 | 2.19 | 3.37 | 3.03 | 3.08 |
| Mathematics | 1.77 | 1.58 | 1.61 | 2.15 | 1.94 | 1.97 | 3.03 | 2.72 | 2.77 |
| Social studies | 2.47 | 1.94 | 1.98 | 2.04 | 2.38 | 2.41 | 3.71 | 3.33 | 3.39 |
| Philosophy and psychology[1] | 1.75 | 1.56 | 1.59 | 2.12 | 1.91 | 1.94 | 2.99 | 2.68 | 2.73 |
| Science | 2.16 | 1.94 | 1.97 | 2.61 | 2.36 | 2.39 | 3.66 | 3.29 | 3.35 |
| Home economics | 1.91 | 1.71 | 1.74 | 2.33 | 2.10 | 2.13 | 3.27 | 2.94 | 2.99 |
| Physical education | 1.91 | 1.71 | 1.74 | 2.33 | 2.10 | 2.13 | 3.27 | 2.94 | 2.99 |
| Journalism | 1.91 | 1.71 | 1.74 | 2.33 | 2.10 | 2.13 | 3.27 | 2.94 | 2.99 |
| Architecture | 1.91 | 1.71 | 1.74 | 2.33 | 2.10 | 2.13 | 3.27 | 2.94 | 2.99 |
| Art | 1.64 | 1.46 | 1.49 | 2.00 | 1.80 | 1.83 | 2.81 | 2.53 | 2.57 |
| Music | 2.19 | 1.97 | 2.00 | 2.68 | 2.42 | 2.45 | 3.76 | 3.38 | 3.44 |
| Engineering | 1.96 | 1.76 | 1.79 | 2.40 | 2.16 | 2.19 | 3.37 | 3.03 | 3.08 |
| Forestry | 1.91 | 1.71 | 1.74 | 2.33 | 2.10 | 2.13 | 3.27 | 2.94 | 2.99 |
| Mining | 1.91 | 1.71 | 1.74 | 2.33 | 2.10 | 2.13 | 3.27 | 2.94 | 2.99 |
| Pharmacy | 1.91 | 1.71 | 1.74 | 2.33 | 2.10 | 2.13 | 3.27 | 2.94 | 2.99 |
| Library economy | 1.91 | 1.71 | 1.74 | 2.33 | 2.10 | 2.13 | 3.27 | 2.94 | 2.99 |
| Law | 3.19 | 2.89 | 2.94 | 3.94 | 3.55 | 3.60 | 5.52 | 4.97 | 5.05 |
| All | 1.91 | 1.71 | 1.74 | 2.33 | 2.10 | 2.13 | 3.27 | 2.94 | 2.99 |

[1] See p. 49.

TABLE 19.—*Weighted values for clock hours of lecture.*

| Subject or group. | Lower division. | | | Upper division. | | | Graduate work. | | |
|---|---|---|---|---|---|---|---|---|---|
| | First-time work. | Non-first-time work. | All work. | First-time work. | Non-first-time work. | All work. | First-time work. | Non-first-time work. | All work. |
| Foreign language | 6.87 | 3.67 | 4.24 | 6.87 | 3.93 | 4.55 | 8.67 | 4.99 | 5.77 |
| English [1] | 3.89 | 2.24 | 2.59 | 4.20 | 2.41 | 2.79 | 5.20 | 3.01 | 3.52 |
| Mathematics | 5.12 | 2.95 | 3.41 | 5.52 | 3.17 | 3.67 | 6.99 | 4.02 | 4.65 |
| Social studies | 6.37 | 3.67 | 4.24 | 6.86 | 3.91 | 4.56 | 8.68 | 4.99 | 5.78 |
| Philosophy and psychology | 3.53 | 2.03 | 2.35 | 3.79 | 2.18 | 2.52 | 4.80 | 2.76 | 3.20 |
| Oriental | 2.19 | 1.26 | 1.46 | 2.38 | 1.36 | 1.57 | 2.96 | 1.72 | 1.99 |
| Education [1] | 1.65 | 2.68 | 3.10 | 5.03 | 2.89 | 3.34 | 6.31 | 3.65 | 4.22 |
| Science | 3.63 | 2.09 | 2.42 | 3.91 | 2.25 | 2.60 | 4.91 | 2.81 | 3.29 |
| Home economics | 4.24 | 2.44 | 2.82 | 4.56 | 2.62 | 3.03 | 5.77 | 3.32 | 3.84 |
| Physical education | 4.24 | 2.44 | 2.82 | 4.56 | 2.62 | 3.03 | 5.77 | 3.32 | 3.84 |
| Journalism | 4.24 | 2.44 | 2.82 | 4.56 | 2.62 | 3.03 | 5.77 | 3.32 | 3.84 |
| Architecture | 4.24 | 2.44 | 2.82 | 4.56 | 2.62 | 3.03 | 5.77 | 3.32 | 3.84 |
| Art [1] | 3.62 | 2.09 | 2.41 | 3.91 | 2.25 | 2.60 | 4.97 | 2.85 | 3.30 |
| Music [1] | 4.87 | 2.80 | 3.24 | 5.24 | 3.01 | 3.48 | 6.64 | 3.87 | 4.42 |
| Engineering [1] | 1.25 | 2.15 | 2.84 | 4.58 | 2.63 | 3.04 | 5.79 | 3.49 | 4.85 |
| Forestry | 4.24 | 2.44 | 2.82 | 4.56 | 2.62 | 3.03 | 5.77 | 3.32 | 3.84 |
| Mining | 4.24 | 2.44 | 2.82 | 4.56 | 2.62 | 3.03 | 5.77 | 3.32 | 3.84 |
| Pharmacy | 4.24 | 2.44 | 2.82 | 4.56 | 2.62 | 3.03 | 5.77 | 3.32 | 3.84 |
| Library economy | 4.24 | 2.44 | 2.82 | 4.56 | 2.62 | 3.03 | 5.77 | 3.32 | 3.84 |
| All | 1.24 | 2.44 | 2.82 | 4.56 | 2.62 | 3.03 | 5.77 | 3.32 | 3.84 |

[1] See p. 49.

TABLE 20.—*Weighted values for clock hours of mixed lecture and discussion.*

| Subject or group. | Lower division. | | | Upper division. | | | Graduate. | | |
|---|---|---|---|---|---|---|---|---|---|
| | First-time work. | Non-first-time work. | All work. | First-time work. | Non-first-time work. | All work. | First-time work. | Non-first-time work. | All work. |
| Foreign language | 2.44 | 1.84 | 1.92 | 3.30 | 2.48 | 2.70 | 4.86 | 3.63 | 3.81 |
| English | 2.15 | 1.62 | 1.69 | 2.91 | 2.18 | 2.28 | 4.26 | 3.18 | 3.31 |
| Mathematics | 2.01 | 1.51 | 1.58 | 2.73 | 2.05 | 2.14 | 3.99 | 2.98 | 3.13 |
| Social studies | 2.66 | 2.00 | 2.09 | 3.58 | 2.69 | 2.81 | 5.26 | 3.94 | 4.13 |
| Philosophy and psychology | 2.11 | 1.61 | 1.68 | 2.88 | 2.16 | 2.26 | 4.23 | 3.17 | 3.32 |
| Education | 2.57 | 1.93 | 2.02 | 3.48 | 2.61 | 2.73 | 5.10 | 3.81 | 4.00 |
| Science | 2.31 | 1.74 | 1.82 | 3.13 | 2.36 | 2.46 | 4.60 | 3.31 | 3.61 |
| Home economics | 2.34 | 1.76 | 1.84 | 3.16 | 2.37 | 2.48 | 4.64 | 3.47 | 3.64 |
| Physical education | 2.34 | 1.76 | 1.84 | 3.16 | 2.37 | 2.48 | 4.64 | 3.47 | 3.64 |
| Journalism | 2.34 | 1.76 | 1.84 | 3.16 | 2.37 | 2.48 | 4.64 | 3.47 | 3.64 |
| Architecture | 2.34 | 1.76 | 1.84 | 3.16 | 2.37 | 2.48 | 4.64 | 3.47 | 3.64 |
| Art [1] | 2.01 | 1.51 | 1.58 | 2.71 | 2.04 | 2.13 | 3.99 | 2.98 | 3.13 |
| Music [1] | 2.68 | 2.02 | 2.11 | 3.63 | 2.72 | 2.85 | 5.34 | 3.99 | 4.19 |
| Engineering | 2.35 | 1.77 | 1.85 | 3.17 | 2.38 | 2.49 | 4.65 | 3.48 | 3.65 |
| Forestry | 2.34 | 1.76 | 1.84 | 3.16 | 2.37 | 2.48 | 4.64 | 3.47 | 3.64 |
| Mining | 2.34 | 1.76 | 1.84 | 3.16 | 2.37 | 2.48 | 4.64 | 3.47 | 3.64 |
| Pharmacy | 2.34 | 1.76 | 1.84 | 3.16 | 2.37 | 2.48 | 4.64 | 3.47 | 3.64 |
| Library economy | 2.34 | 1.76 | 1.84 | 3.16 | 2.37 | 2.48 | 4.64 | 3.47 | 3.64 |
| All | 2.34 | 1.76 | 1.84 | 3.16 | 2.37 | 2.48 | 4.64 | 3.47 | 3.64 |

[1] See p. 49.

TABLE 21.—*Weighted values of clock hours of oral quiz, of scheduled conference, and of seminar.*

| Subject or group. | Lower division. | | | Upper division. | | | Graduate. | | |
|---|---|---|---|---|---|---|---|---|---|
| | First-time work. | Non-first-time work. | All work. | First-time work. | Non-first-time work. | All work. | First-time work. | Non-first-time work. | All work. |
| ORAL QUIZ. | | | | | | | | | |
| Science | 1.98 | 1.94 | 1.94 | 2.20 | 2.16 | 2.16 | ..... | ..... | ..... |
| All subjects | 1.67 | 1.64 | 1.64 | 1.86 | 1.83 | 1.83 | ..... | ..... | ..... |
| SCHEDULED CONFERENCE. | | | | | | | | | |
| English | ..... | 1.11 | 1.11 | ..... | 1.33 | 1.33 | ..... | 1.11 | 1.11 |
| All subjects | ..... | 1.07 | 1.07 | ..... | 1.28 | 1.28 | ..... | 1.08 | 1.08 |
| SEMINAR. | | | | | | | | | |
| All subjects | ..... | ..... | ..... | ..... | ..... | ..... | 3.21 | 1.99 | 2.24 |

TABLE 22.—*Weighted values of clock hours of laboratory, shop, and field.*

| Subject or group. | Lower division. | | | Upper division. | | | Graduate. | | |
|---|---|---|---|---|---|---|---|---|---|
| | First-time work. | Non-first time work. | All work. | First-time work. | Non-first-time work. | All work. | First-time work. | Non-first-time work. | All work. |
| LABORATORY. | | | | | | | | | |
| Philosophy and psychology | *1.36* | *1.25* | *1.26* | *1.27* | *1.16* | *1.17* | *1.46* | *1.34* | *1.35* |
| Science | 1.39 | 1.26 | 1.29 | 1.30 | 1.19 | 1.20 | 1.49 | 1.37 | 1.38 |
| Home economics | 1.54 | 1.42 | 1.43 | 1.44 | 1.32 | 1.33 | 1.65 | 1.52 | 1.53 |
| Physical education | 1.27 | 1.17 | 1.18 | 1.18 | 1.08 | 1.09 | ..... | ..... | ..... |
| Architecture | *1.36* | *1.25* | *1.26* | *1.27* | *1.16* | *1.17* | *1.46* | *1.34* | *1.35* |
| Art | 1.28 | 1.18 | 1.19 | 1.19 | 1.09 | 1.10 | 1.37 | 1.26 | 1.27 |
| Engineering | 1.32 | 1.21 | 1.22 | 1.25 | 1.14 | 1.15 | 1.43 | 1.31 | 1.32 |
| Forestry | *1.36* | *1.25* | *1.26* | *1.27* | *1.16* | *1.17* | *1.46* | *1.34* | *1.35* |
| Mining | 1.18 | 1.08 | 1.09 | 1.10 | 1.00 | 1.01 | 1.25 | 1.15 | 1.16 |
| Pharmacy | *1.36* | *1.25* | *1.26* | *1.27* | *1.16* | *1.17* | *1.46* | *1.34* | *1.35* |
| Library economy | ..... | ..... | ..... | 1.38 | 1.20 | 1.27 | 1.58 | 1.45 | 1.46 |
| Law[1] | ..... | ..... | ..... | 2.26 | 2.06 | 2.08 | 2.60 | 2.38 | 2.40 |
| All subjects | 1.36 | 1.25 | 1.26 | 1.27 | 1.16 | 1.17 | 1.46 | 1.34 | 1.35 |
| SHOP. | | | | | | | | | |
| Engineering and mining | ..... | 1.28 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| FIELD. | | | | | | | | | |
| Forestry | ..... | ..... | ..... | ..... | 1.17 | ..... | ..... | ..... | ..... |

[1] Computed from six hours of moot court.

We are now ready to compute the weighted values in foreign language for first-time and nonfirst time recitation in the lower division as required for complete illustration. For the first-time work we have the proportional equation $e_1 : e_2 = f : x$, in which $e_1$ is the number of hours of work per clock hour of recitation for all subjects in lower-division, $e_2$ is the number of hours of work for all subjects per clock hour of recitation for first-time work in lower-

division, $f$ is the number of hours of work per clock hour of recitation in foreign language in the lower division, and $x$ is the number of hours of work per clock hour of first-time recitation in foreign language in the lower division. Substituting the known values, we have—

$$1.74 : 1.91 = 1.67 : x$$
$$1.74x = 3.19$$
$$x = 1.83.$$

By means of a similar proportional equation we obtain the weighted value 1.64 for nonfirst time work in foreign language in the lower division.

With exceptions to be noted, the procedure just described has been used in computing all weighted values appearing in these tables. Table 12 shows that for some subjects or subject groups the numbers of clock hours of some of the modes of presentation are so small as to make a weighted value based on their averages a relatively undependable figure. For instance, for the group of social studies only 7½ clock hours of recitation are reported. To compute a weighted value with the average number of hours of work per clock hour of recitation for this subject group as a foundation would be unsafe. So in this case the weighted value for recitation was obtained by the solution of a proportional equation introducing the weighted value of a clock hour of the most common mode of presentation reported for this group, viz, mixed lecture and discussion. The proportional equation used here was $c : d = w : x$ in which $c$ is the average number of hours of work per clock hour of mixed lecture and discussion for all subjects in the lower division, $d$ is the average number of hours of work per clock hour of recitation in all subjects in the lower division (for $c$ and $d$ see Table 13), $w$ is the weighted value of a clock hour of mixed lecture and discussion in the social studies in the lower division (see Table 20), and $x$ is the weighted value of a clock hour of recitation in the social studies in the lower division. Substituting the known values, we have—

$$1.84 : 1.74 = 2.09 : x$$
$$1.84x = 3.64$$
$$x = 1.98.$$

This value of $x$ is introduced in its proper place in Table 18 and from it the two remaining weighted values for lower-division work also to be found in this table have been computed in a manner previously described. The method of calculation of the weighted values for the social studies in the upper and graduate divisions may be inferred from the preceding. This method of obtaining weighted

values has been used whenever the number of clock hours of the mode of presentation has been less than 10, and when, at the same time, the subject or subject group is represented in Table 12 by 10 or more clock hours of some other mode of presentation. This minimum was rather arbitrarily chosen after a number of trial computations of averages had been made, and is considered large enough to eliminate the worst of the variation due to a small representation of a subject or group in a mode of presentation. Resort to this method is signified by the use of the superscript (1) immediately following the name of the subject or subject group.

In instances of subjects or subject groups which are represented in none of the three modes of recitation, lecture, or mixed lecture, and discussion by as many as 10 or more clock hours, it has been necessary to introduce in Tables 18–20 the weighted values found for all subjects, which are shown in the lowest horizontal columns of each of the tables of weighted values. This is not the method to be desired, but seems to be the only recourse in the circumstances. Such introduction is indicated by the use of italics.

It was stated at the beginning of the description of the method of compilation of the tables of weighted values that they are designed to recognize all factors found to be notably influential in determining the teaching load per clock hour of instruction except size of class. (*a*) The mode of presentation as a factor is recognized by having each of the tables give the weighted values for different modes, as recitation, lecture, mixed lecture and discussion, oral quiz, scheduled conference, seminar, laboratory, shop, and field.

(*b*) The subject or subject group as a factor is recognized by having the weighted values entered by subject or subject groups listed in the left-hand columns of the tables. In instances where certain modes of presentation are not reported for certain subjects or subject-groups, or where the work infrequently classifies under a mode, these subjects or subject groups are omitted from the table. For these reasons, e. g., education and oriental are omitted from Table 18. Law is omitted from Table 19, not because the lecture mode of presentation is not used in this subject, but because a combination of modes is used which the instructors of that subject designate as recitation. Tables 18, 19, and 20 are more nearly complete in the recognition of subject differences than are the succeeding tables. Table 21, giving weighted values for oral quiz, because of the small number of clock hours of this mode reported for most subjects, presents weighted values for the science group and "All subjects"; it also contains weighted values for scheduled conference, and recognizes only English and "All subjects"; containing weighted values for seminar, it gives no subject distinctions. Table 22, presenting

weighted values for laboratory, shop, and field, recognizes all subjects for which these modes of presentation were reported.

(*c*) The influence of the elementary or advanced character of the work as a factor is recognized in the tables in presenting the weighted values by lower, upper, and graduate divisions. In Tables 18, 19, and 20 a complete set of weighted values has been computed for all three divisions. As the oral-quiz mode seems not to be used in the graduate division, Table 21 contains no weighted values for that division. As the seminar mode is used almost exclusively in graduate classes, it does not seem necessary to compute weighted values for the mode in the lower and upper divisions. Weighted values for laboratory have been omitted from the lower division in library economy and law and from the graduate division in physical education, as there was no laboratory work of these divisions reported in these subjects. Similar explanations will account for the omissions of figures for two of the three divisions from Table 22.

(*d*) Previous experience or inexperience of the instructor with the work taught is recognized in these tables by the figures for weighted values presented under the rubrics "first-time" work and "non-first-time" work. The tables not giving recognition to this factor are those presenting weighted values for scheduled conference, shop, and field, and these omissions are to be explained by the attenuated distributions or complete absence of "first-time" work in these modes in the data used in this study.

*Concerning the validity of the method of computing the weighted values.*—Throughout the description of the method of computing the weighted values of Table 18, etc., some such queries as the following may have arisen in the mind of the reader: Why obtain the weighted values by the method of proportional equations here used instead of from one large original distribution table, which should be so organized as to analyze the influence of all the hypothetical factors at one time, and from which the correct average number of hours of work per clock hour of instruction could be directly taken without the interposition of the method of proportional equations? And, again, is there not a measure of fallacy in this method of indirect computation through proportional equations, due to a confusion of factors in the tables devised to analyze the influence of these factors? The former of these queries may be answered by saying that the method it implies to be the more satisfactory was the first one tried in attacking the data, but was found to be impracticable because the distributions of clock hours became so attenuated in a table providing so many refinements that no dependable averages could be obtained. This impracticability will come home to the reader if he will imagine the distributions of clock hours in Table 12 again broken into the

three classes of lower, upper, and graduate division work, and these distributions again divided into "first time," and "nonfirst time" groups. Manifestly, to have fairly large numbers of clock hours from which to calculate the averages, resort must be had to a method similar to the one used.

A frank answer to the second query must admit the possibility of a slight extent of fallacy, due to the confusion of factors in the tables planned to analyze the influence of the factors, but careful reconsideration of the construction of these tables and the method of calculating the weighted values will show that the possibility of error is by no means large. In addition to the original distributions used to compute the average year place of the work reported in a subject or subject group, as illustrated on page 49, it may be remembered that the only tables that have been used in the computation of the weighted values are 12, 13, and 14. Table 12 recognizes mode of presentation and subject, leaving out of consideration the elementary or advanced character of and previous experience or inexperience with the work. That is, in attempting to analyze the influence of the former two factors the averages thus obtained have also been influenced by the two remaining factors. It must be recalled, however, that before the averages for subjects in this table were used in computing the weighted values, the average year place of the work reported in a subject was computed, and this year place given recognition in the computation. In this way the confusion that ignoring the influence of this factor of the elementary or advanced character of the work would bring has been largely eliminated. The remaining factor—previous experience or inexperience with the work—is the only one that has been ignored in utilizing this table. That disregard of this factor in using the averages of this table is not disastrous to the reliability of our method may be judged by comparison of the averages for nonfirst time work and all work in Table 14. Except in two instances—lecture and seminar—these averages for nonfirst time work and all work are equal or almost equal, and in these two cases they differ by 0.40 and 0.25 of an hour, respectively. This tendency toward a small difference or identity in these averages is due to the relatively small proportion the "first time" clock hours are of all clock hours reported. As the averages in Table 12 are for all work, it should be clear that weighted values based upon them are not much discredited by the fact that this factor of previous experience or inexperience with the work has been disregarded.

Table 13 analyzes the influence of mode of presentation and the elementary or advanced character of the work, but disregards the incidence of the influence of subject and previous experience or inexperience with the work, while Table 14 analyzes the influence of mode of presentation and previous experience or inexperience with

the work, disregarding subject and the elementary or advanced character of the work. The subject as a factor is disregarded in both these tables, but by using as our basic figures in the computation of the weighted values the averages by subjects in Table 12, the influence of this factor has been introduced in the weighted values. The relative inconsequence of disregarding previous experience or inexperience with the work has already been discussed in connection with the use of the figures in Table 12 in a preceding paragraph. The disregard of the influence of the elementary and advanced character of the work that follows from using the averages of Table 14 may to a slight extent affect the weighted values in undesired directions.

In the face of these admissions of sources of partial weakness of the method of computing the weighted values, we ought not to forget that the incidence of such untoward influence, where such large numbers of clock hours are concerned as in these tables, will tend to be so distributed as in large part to mitigate the evils that may arise.

*Application of the method of adjusting the teaching load.*—We may now proceed to illustrate the method of application of the weighted values to the adjustment of the teaching load. In doing so, in order to make the illustrations readily intelligible, any necessary special allowance for the remaining components of the total working load, viz, supervision of students working on individual research problems, personal research, office hours, committee, and administrative work, and other professional activities, will at first be left out of consideration. That is, we shall set out by illustrating the application to instructors who are expected to carry a full teaching load without *special* additional activities. For such illustration we must first have before us the normal number of hours per week devoted to teaching work by full-time instructors. Group 3 of Table 9 (p. 23) shows the average length of the teaching day of such full-time instructors to be 6.1—approximately 6 hours. As this has been calculated from a school week containing 5½ teaching days, this will mean an average total teaching week of 33 hours, which will be used as the point of departure in ascertaining the clock hours of instruction that should be carried. Reference to the remaining figures for group 3 in this table will discover that this allows to the average full-time instructor approximately 2 hours (column 4b) of an average approximate eight-hour day (column 5b), or 11 hours per week for noninstructional activities.

The illustrations to follow aim to demonstrate the application of the weighted values to some of the main types of problems likely to arise in the adjustment of the teaching load. To illustrate for all types of problems and for all subjects or subject groups would be both unnecessary and a waste of space and time.

(*a*) The first illustration—a very simple one—is that required to answer the question, how many clock hours of instruction should be assigned to a teacher of foreign language who carries only lower-division work and has had previous experience with the courses to be taught? Table 18 shows the weighted value of a nonfirst-time clock hour of lower-division recitation (the mode of presentation almost universal in this subject group in this division) to be 1.64 hours. Dividing 33 by 1.64 we have a quotient of approximately 20, the number of clock hours of such instruction that should be carried. If the instructor is new to his work, we should divide 33 by the weighted value 1.83 (see first-time column of Table 18), the quotient obtained signifying that he should carry 18 clock hours—i. e., 2 clock hours less than if he had had previous experience with the work.

(*b*) However, in practice few instructors are assigned work solely in one division, as has been assumed in this illustration. More frequently the work is distributed in two or three divisions. The problem here might come up in something like the following manner: Is an instructor in foreign language carrying a full teaching load if he is responsible for a 5-hour course in lower division; two 3-hour courses in upper division, one of these being conducted by the recitation mode of presentation, and the other being a course in the history of the literature in this language, by the mixed lecture and discussion mode; and a 2-hour seminar—all these courses except the last having been previously taught by him? From Table 18 we find that the 5-hour course in the lower division represents a total weighted value of $5\times1.64=8.20$; the 3-hour upper-division recitation course has a total weighted value of $3\times2.02=6.06$; the 3-hour upper-division mixed lecture and discussion course (Table 20), $3\times2.48=7.44$; the 2-hour seminar, $2\times3.21=6.42$. The total weighted value is 8.20 plus 6.06 plus 7.44 plus 6.42=28.12—i. e., 4.88, or almost the equivalent of a 2-hour upper division mixed lecture and discussion course less than should be carried.

(*c*) Application may also be made for instruction in English. It may be asked how many clock hours should be assigned to an instructor carrying work solely in the lower division, provision first being made for 10 clock hours of scheduled conference? According to Table 21 the total weighted value of these 10 hours of scheduled conference is $10\times1.11=11.1$. Subtracting these from the total of 33 hours, we have 21.9 hours to be assigned to recitation clock hours at the weighted value of 1.76 hours each. This means 21.9 divided by 1.76, or approximately 12 such clock hours.

(*d*) If the problem is that of the adjustment of the teaching load of an instructor of English who carries a 5-hour recitation course in the lower division, the remainder of his time, exclusive of 10 hours

of scheduled conference equally divided between lower and upper division, being devoted to mixed lecture and discussion work in the upper division, it will be solved as follows: The total weighted value of the lower-division recitation (Table 18) course is $5\times1.76=8.80$; of 5 hours of lower-division conference (Table 21), $5\times1.11=5.55$; of 5 hours of upper-division conference (Table 21), $5\times1.33=6.65$. So far, 8.80 plus 5.55 plus 6.65, or 21 hours of the total of 33 have been disposed of, leaving 12 hours for assignment to upper-division mixed lecture and discussion. This will mean 12 divided by 2.18, or approximately 5 or 6 hours of such work.

(*e*) Illustration of such application in the department of education is a relatively simple matter. The most-frequent mode of presentation here is mixed lecture and discussion. For an instructor who is teaching only upper-division work with which he has had previous acquaintance, this proper number of clock hours of instruction will be 33 divided by 2.61 (see Table 20), or approximately 13.

(*f*) Illustration for the field of science is not as easy, as almost always two or more modes of presentation are involved. The problem may arise in the following manner: An instructor carries the lecture and oral-quiz work of two lower-division courses in science with which he has had previous experience. These include, together, 6 lecture hours and 2 quiz hours. He is to carry laboratory hours in addition up to a full teaching load; it is desired to known what this number of laboratory hours should be. According to Table 19 the weighted value of the lecture hours is $6\times2.09$, or 12.54. From Table 21 we find that the weighted value of the quiz hours is $2\times1.94$, or 3.88. This is a total of 16.42 hours, leaving 16.58 of the average of 33 hours to be applied to laboratory at a weighted value of 1.28 (see Table 22), which means 16.58 divided by 1.28, or 13 clock hours of laboratory.

(*g*) As it is a relatively new field, some interest may attach to an illustration of application in the adjustment of the teaching load in home economics. Our illustration may assume 3 clock hours of mixed lecture and discussion and 12 clock hours of laboratory, all nonfirst time work, in the upper division, the remaining portion of the instructor's teaching load to be given to lower-division laboratory. The 3 hours of mixed lecture and discussion [1] (see Table 20) have a weighted value of $3\times2.37$, or 7.11. The 12 clock hours of laboratory (see Table 22) have a total weighted value of $12\times1.32$, or 15.84. Thus, 7.11 plus 15.84, or 22.95, hours of the average teaching load of 33 hours are used in this upper-division work, leaving 10.05 hours to be devoted to lower-division laboratory at a weighted

[1] As has been previously explained (p. 43), because of the small number of clock hours of mixed lecture and discussion reported for this department, the weighted values for all subjects given in the lowest horizontal column of this table are used.

value of 1.42 hours (see Table 22) per clock hour. This means approximately 7 such lower-division laboratory clock hours.

(*h*) As a last illustration let us apply the weighted values for teaching work in law to the adjustment of the teaching load. It has already been stated (p. 49) that the mode of presentation commonly reported for law is recitation. The weighted value for the upper-division recitation clock hour in law (see Table 18) is 3.55. Dividing the average teaching load, 33 hours, by this value, we arrive at a teaching load of 9 clock hours.

Having illustrated the method of adjusting the teaching load of full-time instructors, it is now appropriate to address a word of explanation and justification to one feature of this study—the consistent use of and dependence upon the average or arithmetic mean. The reader has noted its use in computing the foundation measures of the number of hours of work done in connection with a clock hour of instruction; these are the averages upon which the tables of weighted values were constructed. It was also used to arrive at the number of hours per day which the full-time instructor may be expected to devote to instruction (approximately 6 hours) as well as to all professional activities (approximately 8 hours). It has been introduced into computations at other points in the study. The average has been consistently used because it is the *average* instructor (here used in terms of rate of working) for whom the university must adjust the teaching load. It would clearly be out of question for the university to adjust teaching loads by the rates of working of *individual* instructors. For instance, because the university administration must expect an approximately equal amount of service of all instructors, it would be unfair to the university to adjust teaching loads of individuals who are slower than the average to their rate of working. On the other hand, it would be unfair to those who work at a more rapid rate than the average to adjust their teaching loads to *their* rates of working. In other words, the instructor slower than the average must expect to pay the penalty of his slowness in longer hours of work, whereas the instructor who is more rapid than the average of his colleagues should have the margin of time which he gains by his more rapid rate to dispose of as he chooses.

It remains to comment briefly on the adjustment of the teaching load by the making of necessary special allowances for other possible components of the total working load—viz, (1) supervision of students working on individual research problems, (2) personal research, (3) office, committee, and administrative work, and (4) other professional activities.

(1) On page 10 it is stated that the time required for the supervision of students working on individual research problems averaged

0.76 hour per student. One or two such students could not affect the total working load of an instructor sufficiently to necessitate a special allowance on account of the amount of supervision required, and, as it may be seen from Table 2 (p. 11) that only 20 instructors report as many as three or more, such a special allowance will need to be made in only a relatively small proportion of cases. As has already been stated on page 11, if no adjustment has already been made in assigning to the instructors the courses in which these students who are working on individual research problems are enrolled, it will be advisable to make some reduction in the teaching schedule for those who must supervise four or more students in such work. Such adjustment may be made by subtracting from the basic 33 hours of instructional time the number of hours that will probably be required for the work of supervision—this number of hours to be obtained by multiplying 0.76 by the number of such students—before proceeding to fix the number of clock hours of instruction to be carried.

(2) As in the case of the supervision of students working on individual research problems, the essential principle to be recognized in making special allowances for personal research has already been enunciated in an earlier section of this report (p. 25). The recommendation has been against a general reduction of the teaching schedule, because the facts indicate that this would not be an economical method of encouraging personal research. The method supported by the facts presented is the reduction of the teaching schedule for individual instructors who have demonstrated their inclination toward and ability in research by some measure of productivity in spite of a normal teaching schedule. The exact extent and significance of any allowance made will be more nearly measurable if made either as a reduction of the normal load of 33 hours of teaching work (*a*) by some definite number of hours of this teaching load or (*b*) by a definite number of some specific kind of clock hour of instruction whose weighted value is known than if stated in terms of unspecified clock hours. For instance, a reduction by 10 hours of the normal teaching load of 33 hours would leave 23 hours of teaching work to be distributed by means of known weighted values to a definite number of clock hours of instruction. Again, a reduction of this normal load by two clock hours of nonfirst time upper-division mixed lecture and discussion in science would leave $33-(2\times2.36)$, or 28.28 hours, to be distributed by means of known weighted values to a definite number of clock hours of instruction. It is easily conceivable that a reduction in terms of unspecified clock hours for an instructor who has been teaching nonfirst time lower-division work might be offset by assigning to him a less number of clock hours of first time upper-division work and such an assignment might still be in compliance with the terms of the provision for a reduction. If a

reduction is to be made in terms of clock hours, the kinds of clock hours ought at least to be specified, since, assuredly, judging from our weighted values, a reduction, e. g., of 2 clock hours of nonfirst time lower-division recitation in foreign language would not be the equivalent of a reduction of two clock hours of first time upper-division lecture in the same subject group. Of the two methods of specifying an allowance of teaching time for personal research which are here recommended, the former is the preferable, unless in using the latter it is understood that the *equivalent in weighted value* of the specified clock hours, not the specified clock hours themselves, is meant. To insist on a reduction in specified clock hours themselves might bring inconvenience to those who are responsible for distributing courses within a department.

(3) It has been pointed out on page 16 that relatively few full-time instructors (i. e., instructors who are not also heads of other than one-man departments or deans) will require special reductions of their teaching schedules for office hours, committee and administrative work. Such reductions are to be made only when the regular demand upon an instructor for this type of activity is much more than the average of 3.6 hours per week found for full-time instructors. The need for this average amount of time is recognized in the 2 hours per day of leeway between the average teaching day of approximately 6 hours and the average total working day of approximately 8 hours. It was also stated that allowances should be made for heads of other than one-man departments and for deans. The difference between the average number of hours spent in the activities under consideration by heads of departments (exclusive of the one reporting 41.3 hours for the week) and by full-time instructors being approximately 7 hours, for the average head of a department the normal load of 33 hours of teaching work should be reduced by this amount or its equivalent in specified clock hours of instruction. The difference between the averages for deans who are also heads of departments and for full-time instructors being approximately 15 hours, for the average dean the normal load of 33 hours of teaching work should be reduced by this amount or its equivalent in specified clock hours of instruction. But, since the demand for such activity must be heavier for some heads of departments and deans than for others, such reductions, to be just and economical, should not be uniform for all heads of departments and for all deans. On account of the short period of time—one week—covered by the reports used in this study, no recommendation can be made here for specific heads or deans. A supplementary investigation extending through a longer period of time must be made before reductions may be made in whose justice we may place much confidence.

(4) In an earlier section of this report (pp. 17–18) such facts as have been available touching the time spent in "professional activities not otherwise reported" have been presented and interpreted. Notwithstanding that no recommendation could be made in the matter of reduction of teaching time for most of the subjects and subject groups represented in this investigation, the facts indicated that for some subjects—the newer and more rapidly developing ones—the demand upon the instructor of these other professional activities is heavier than for others, and that for the former subjects, when the average number of hours per week exceeds notably the average of 5 to 6 hours found for all instructors, there should be a corresponding reduction in the teaching schedule for particular subjects or instructors. For subjects in which and instructors for whom the demand for such activity is at this average or less, there should be no such allowance, as it is already cared for by the leeway between the average 6-hour teaching day and the average 8-hour working day of full-time instructors. When allowances are made they should be made as reductions of the normal load of 33 hours per week of teaching work or the equivalent of the reductions in specific clock hours of instruction. As soon as it appears that such concessions are no longer necessary or are no longer properly utilized, they should be withdrawn. Because of the paucity and weakness of the figures for subjects and subject groups as presented in Table 7, before the extent of such concessions may be justly determined a supplementary investigation should be made into the time spent in these other professional activities either by a larger number of instructors or through a longer period of time, or both. Such a supplementary investigation should distinguish between activities that bring additional remuneration and those that do not—an important distinction which was overlooked in the present investigation.

# APPENDIX.

## THE QUESTIONNAIRE USED IN THE INVESTIGATION.

### Sheet 1.

This questionnaire is being sent to all teaching members of the faculty with the aim of securing data that will throw further light on the problem of the proper assignment of teaching hours. In this instance we are investigating one important aspect of the relative difficulty of the several types of work, that which is represented by the total time consumed in carrying them on. You are asked to take note of all time spent outside the class period in preparation for and in connection with the courses and sections you are teaching, as well as in other activities, and to record the time in the appropriate spaces. Your report should cover the class and other work included in the school week beginning Monday, May 14, and ending Saturday, May 19.

*In this investigation there is no intention to check up the total time expenditure of the individual faculty member with a view to measuring his teaching efficiency.*

IMPORTANT DIRECTIONS.

(*a*) Read the questionnaire carefully as soon as possible, noting the classifications of time expenditure, in order to avoid making a report that can not be used when the data are finally assembled.

(*b*) Your reports on the time spent outside the class period in preparation for and in connection with the class work and in other activities outside the class periods should not be mere guesses but should be based on reference to a timepiece.

(*c*) Make a report for each course or section for which you have teaching responsibility. If you are conducting only a part of the work in a course, e. g., quiz, laboratory or lecture section, reading papers, etc., the remainder of the work being conducted by some other person, be sure to make this fact clear in your report. Give the time only for the work for which you are responsible and state specifically what parts of the work are done by others.

(*d*) If the same preparation suffices for two or more sections of the same course, distribute the time in equal parts to each of the sections.

(*e*) Be careful otherwise to avoid recording the same time expenditure in more than one place.

---

1. Number of students working on individual research problems under your supervision during the present semester _____. Number of minutes spent in such supervision, if any, during the week of May 14–19 _____.

2. Time spent during the week in research other than that reported elsewhere on this and the accompanying sheet, _____ minutes.

3. Time spent on other official duties for the university (office hours, committee work, administrative functions, etc.), _____ minutes.

4. Time spent in professional activities not otherwise reported. _____ minutes. List here these activities. _____

5. If it is your opinion that any of the courses on which you are reporting should be conducted in some manner (lecture, laboratory, recitation, etc.) other than that which you indicate on page 2 as now obtaining, state specifically in what manner it should be presented, and why. (Use back of this sheet for answer.)

(Answer the following two questions after having filled out the remainder of the questionnaire:)

6. Has the week reported upon been a fairly normal one? _____ If not, in what specific respects has it been exceptional? _____

7. State your opinion of the use of the "total time consumed" as a factor in the determination of the proper number of teaching hours. _____

Name _____

Sheet 2.

Record totals for week in the appropriate spaces below. Report under Nos. 8, 10, 12, 14, 16, 18, 20, 22, 23, and 24 in the left-hand column time spent outside the class periods only.[1]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Department. | | | | | | | |
| 2. Course and section (make a separate report for each section). | | | | | | | |
| 3. Credit carried by course. | | | | | | | |
| 4. Is this the first time you have taught the course? | | | | | | | |
| 5. Year or years in which course is normally taken,[2] 1, 2, 3, 4, 5, 6. | | | | | | | |
| 6. Enrollment during semester. | | | | | | | |
| 7. Hours of recitation. | | | | | | | |
| 8. Total minutes of preparation for recitation. | | | | | | | |
| 9. Hours of lecture during the week. | | | | | | | |
| 10. Total minutes of preparation for lectures during the week. | | | | | | | |

[1] Data relating to one course or section should all be placed in one vertical column.

[2] 1, for freshmen; 2, for sophomores; 5, for graduate courses and professional courses requiring four years of previous training; etc.

| | |
|---|---|
| 11. Hours of oral quiz during week. | |
| 12. Total minutes of preparation for oral quiz. | |
| 13. Hours of mixed lecture and discussion. | |
| 14. Total minutes of preparation for mixed lecture and discussion. | |
| 15. Hours of laboratory. | |
| 16. Total minutes of preparation for laboratory and reading of laboratory notes. | |
| 17. Hours of shop and practice. | |
| 18. Total minutes of preparation or other work in connection with shop and practice. | |
| 19. Hours of seminar. | |
| 20. Total minutes of preparation for seminar. | |
| 21. Hours of *scheduled* conference (not office hours). | |
| 22. Total minutes of preparation for scheduled conference hours. | |
| 23. Total minutes of correction of written and other work (not laboratory notes) outside the class period. | |
| 24. Total minutes in other work for the courses listed not reported elsewhere. Specify the kind of work. | |